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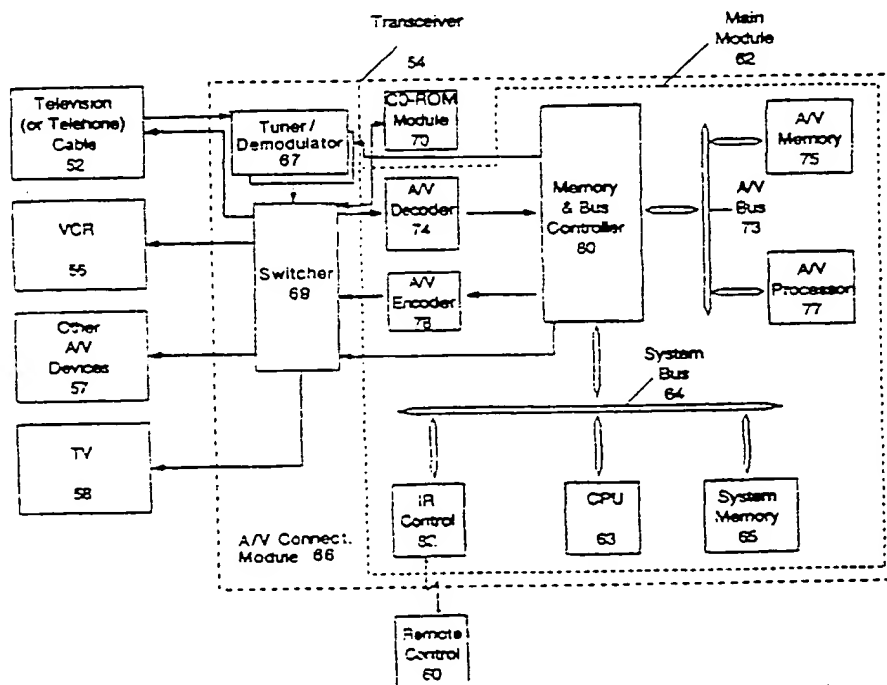
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(34) Title: AN AUDIO-VISUAL SYSTEM FOR SELECTIVELY VIEWING AND INTERACTING WITH PROGRAMS AND SERVICES FROM A NUMBER OF PROGRAM/SERVICE SOURCES

(57) Abstract

An interactive audio-visual (A/V) transceiver is advantageously coupled to a television and/or telephone (T/T) cable, a TV, a video recorder (VCR), and other A/V devices. The A/V transceiver switches data between a program/service provider and the connected A/V devices. In one embodiment, the transceiver includes three primary modules, a main module including a CPU, a system bus, system memory, an infra-red (IR) control unit, an audio-visual bus, an A/V decoder, an A/V processor, and an A/V encoder, an A/V connect module including a number of tuner/demodulators and a switch, and an optional CD ROM module. The A/V transceiver hardware is complemented with an operating system and software program which supports the functions provided in the A/V user interface. Additionally, a remote control device is provided to communicate with the A/V transceiver to interactively manage selection of program and service sources, selection program and

service offerings from any selected source, viewing of selected program offerings, and interaction with selected service offerings. The remote control device is advantageously provided with a basic A/V control button group, an interactive control button group, an auxiliary control button group and a numeric key pad to facilitate control of the transceiver. The interactive control button group includes an info button, a list button, a categories button, a pix button, a mark button, a jump button, and a pointing device consisting of up, down, left and right arrow buttons, and a center select button.



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AN AUDIO-VISUAL SYSTEM FOR SELECTIVELY
VIEWING AND INTERACTING WITH PROGRAMS AND
SERVICES FROM A NUMBER OF PROGRAM/SERVICE SOURCES

RELATED APPLICATIONS

The present application is related to the following
contemporaneously filed applications:

(a) Serial No. _____, entitled "Method And Apparatus
For Controlling An Audio-Visual System For Selectively Viewing And
Interacting With Programs And Services From A Number of
Program/Service Sources";

(b) Serial No. _____, entitled "Methods And Apparatus
For Managing Selection Of Audio-Visual Program And Service
Offerings";

(c) Serial No. _____, entitled "Methods And Apparatus
For Managing Viewing Of And Interaction With Audio-Visual Program
And Service Offerings".

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention relates to the field of audio-visual
systems. More specifically, the present invention relates to a system for
selectively viewing and interacting with programs and services from a
number of program/service sources, a control device for controlling the

The combination of computer technology with television (TV) and audio-visual (A/V) systems, has fostered the development of multi-media interactive entertainment systems. The combination of computer hardware and software with audio-visual systems has brought new forms of art and entertainment into being. CD read only memory (ROM) systems coupled to personal computers permit interactive video computer simulations, unique self-paced learning environments and interactive "movies", not possible in earlier television systems (See, *"The Revolution Starts Here"*, Newsweek, page 42 (January 18, 1993)). It is known that consumers desire interactive television and multi-media applications for home use. One of the biggest challenges for an interactive television service is the design of an interface that is easy and fun to use by average consumers.

In the computer industry, a variety of graphic user interfaces have been developed to facilitate human interaction with computer systems. Many display systems utilize metaphors in the design of the interface as a way of maximizing human familiarity, and conveying information between the user and the computer. It is well known that designing around a familiar metaphor helps reduce human learning time (See for example, Patrick Chan, "Learning Considerations In User Interface Design: *The Room Model*", Report CS-84-16, University of Waterloo Computer Science Department, Ontario, Canada, July, 1984,

SUMMARY OF THE INVENTION

/ The present invention provides methods and apparatus for presenting an improved audio-visual user interface for selecting and displaying cable television or other audio-visual programs, as well as controlling various audio-visual devices and interactive services. The
5 present invention assumes a service provider provides cable television and/or telephone (T/T) service to users via a T/T cable, including a digital channel of program/service listings, at least one digital back channel (from the user's home to a central file server), a number of analog TV channels, a number of digital pay-per-view channels, and
/ other interactive services. Transmitted from remote storage devices such as digital file servers. Under the present invention an interactive audio-visual (A/V) transceiver is advantageously coupled to a user's television, video tape recorder, and the T/T cable. In one embodiment, the transceiver includes three primary modules. A main module
/ includes a central processing unit (CPU) coupled over a digital system bus to system memory and, preferably, an infra-red (IR) or similar wireless control unit. The main module is further coupled over an audio-visual bus to an A/V decoder, an A/V processor, an A/V encoder, a TV, an A/V connect module connected to the T/T cable, and to one or
20 more VCRs and other A/V devices. The main module may also be

providing the same functions (such as a mouse, thumb stick or touch pad). While viewing the TV, a user may obtain additional information on a current program by depressing the info button, and obtaining more detailed information using the pointing device. By depressing the list button on the remote control device, the transceiver displays a program listing of the current programs available for viewing. Through the use of the pointing device, viewers can scroll up and down the program listing or view a highlighted program in full screen by pressing the select button. By pushing the right or left arrow buttons on the pointing device, program listings may also be viewed for different hours, days and up to several weeks in advance through the present invention's use of data interleaving. The depression of the categories button on the remote control device results in the display of a categories menu bar on the TV screen, which includes categories such as "all", "sports", "news" and "favorites". The selection of one of these categories results in the display of only programs within that category. Moreover, through the depressions of both the list button and the categories button, a program listing is displayed of the currently available programs within the selected category. Through the use of the arrow buttons on the pointing device, category listings for different times and dates up to several weeks in advance may also be viewed. The selection of the favorites category results in the display of currently available favorite programs, including

rewinding, or fast-forwarding audio-visual programs on connected A/V playback devices, a numeric keypad for dialing channel numbers, confirming financial transactions with personal identification numbers, an optional microphone with talk button for supplementing the present user interface with direct voice commands through the use of voice recognition technology, a pay-per view interface, and a home shopping interface, as well as other features described herein.

FIGURE 4b illustrates the first embodiment of the remote control device of the present invention shown in Figure 4a with the sliding panel in an open position.

FIGURES 5a and 5b illustrate a second embodiment of the remote control device of the present invention with no sliding panel and additional features.

FIGURE 6 illustrates the present invention's full screen viewing function as viewed by a user with a graphic overlay panel which includes the current channel number as well as the channel logo and identifier.

FIGURE 7 illustrates the present invention's info function showing the first page of the basic information track ("info-track").

FIGURE 8 illustrates the present invention's info function with a second page of basic information, obtained by using the right arrow button on the remote control device.

FIGURE 9 is an additional illustration of the info function of the present invention in which the user has requested a third page of information using the remote control device.

starts at 8:10 p.m., using the right arrow button of the remote control device.

FIGURE 15 is an additional feature of the list function of the present invention where the user marks the highlighted program with the mark button of the remote control device.

FIGURE 16 illustrates the selection of an alternate hourly time slot beginning at 9 p.m. using the right arrow button of the remote control device.

FIGURE 17 illustrates the selection of an alternate day for the program/service listing by depressing the right arrow button of the remote control device.

FIGURE 18 illustrates displaying of a record panel confirming the title and length of the program to be recorded, along with a confirmation of which VCR and tape to record on, by depressing a select button in the remote control device.

FIGURE 19 illustrates the present invention's use of the select button on the remote control device while the program/service

FIGURE 24 further illustrates the categories function wherein the "sports" category is highlighted by depressing the right arrow button on the remote control device.

FIGURE 25 illustrates a representative television image in the case where the "sports" category has been selected by depressing the select button on the remote control device.

FIGURE 26 is a further illustration of a representative television image in which the "sports" category has been selected, and an alternate sports channel has been further selected by a user through the use of the up arrow button on the remote control device.

FIGURE 27 illustrates a sports program listing in which the list button has been depressed after the "sports" category has been selected.

FIGURE 28 illustrates the categories function in conjunction with the list function.

FIGURE 29 further illustrates the categories and list functions when the down arrow button is depressed on the remote

FIGURE 34 illustrates the pix function of the present invention in which a new PIP window has been highlighted and is displayed in a larger format in the center of the display screen.

FIGURE 35 is a further illustration of the present invention's pix function in which, through the use of the remote control device, a PIP window showing a pay-per-view program has been highlighted and is displayed in the center portion of the screen.

FIGURE 36 illustrates the menu function which permits users to press a menu button to switch the television display to other audio-visual devices coupled to the transceiver, such as VCR, CD, on-line services, telephone, etc. For example, once VCR is selected, with the right arrow button, the TV displays an image from the videotape currently in the VCR and the user can press the play button on the remote to playback a previously recorded program on the video tape.

FIGURE 37 illustrates one embodiment of the present invention for selecting a pay-per-view channel offering entitled "Jeff's World" through the use of the select button of the remote control device.

FIGURE 38 illustrates a preview feature of pay-per-view under the above illustrated embodiment.

FIGURE 45 illustrates a menu permitting the user to select various shops available on the home shopping service using the select button on the remote control device under the above illustrated embodiment.

FIGURE 46 is a further illustration of the home shopping service in which a cookware product is highlighted under the above illustrated embodiment.

FIGURE 47 is a further illustration of the home shopping service in which a mini-espresso machine is highlighted, and can be selected for ordering with the select button on the remote control device under the above illustrated embodiment.

FIGURE 48 is an information screen provided to the user after selecting a mini-espresso machine for ordering under the above illustrated embodiment.

FIGURE 49 is an order screen in which the user, using the numeric keypad on the remote control device, enters a personal

NOTATION AND NOMENCLATURE

The detailed descriptions which follow are presented largely in terms of interface display images, algorithms, and symbolic representations of operations of data bits within a computer memory. These algorithmic descriptions and representations are the means used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art.

An algorithm is here, and generally, conceived to be a self consistent sequence of steps leading to a desired result. These steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, displayed and otherwise manipulated. It proves convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, images, terms, numbers, or the like. It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities.

manufactured by the Assignee, Apple Computer, Inc., as well as other manufacturers of computer and computer controlled multi-media systems.

General System Configuration

The multi-media interactive television system of the present invention is illustrated in schematic form in Figure 1. As shown in Figure 1, a cable or telephone service provider 50 provides cable television or telephone (T/T) services over a T/T cable 52 to a plurality of users coupled to the cable or telephone system, as is known. Although in this Specification reference is made to a cable television or telephone system, it will be appreciated by one skilled in the art that the present invention may be used in conjunction with a variety of other electronic transmission systems including satellite service systems, microwave systems, fiber optic, and radio frequency (RF) systems.

As illustrated in Figure 1, the T/T cable 52 is coupled to an audio-visual transceiver 54 which comprises a number of separately identifiable modules. The transceiver 54 is intended to be located in proximity to and coupled to a VCR 56, a television (TV) 58, as well as one or more optional audio-visual devices 57 such as additional VCRs, laser disc players, camcorders, stereos, various storage devices, telephones, faxes and answering machines, as shown. Moreover, it is contemplated that transceiver 54 may be directly incorporated into the VCR 56, the TV 58, or one the other A/V devices 57. As will be described below, a remote control device 60 communicates with the transceiver 54 preferably

or the other A/V devices 57, and couples those signals and data to the main module 62 through the video decoder 74. The A/V connect module further switches audio-visual signals and data received from the main module 62 through the video encoder 78, and sends them back out to the T/T cable 52, the VCR 56, the other A/V devices 57 and/or the TV 58. The A/V connect module 66 includes a switcher 67 and one or more programmable tuners/demodulators 69, wherein one tuner/demodulator reads and displays a current program from one of the channels received over the T/T cable 52, and additional tuners/demodulators (or the same tuner/demodulator, used in alternation) are used to read and display data from the side-band channels in picture-in-picture (pip) windows. In addition, the A/V connect module 66 may include descrambling circuitry (not shown) to descramble premium programs received over the T/T cable 52. It is further contemplated that the A/V connect module 66 provides a graphic overlay function that superimposes an A/V signal from the video encoder 78 against another A/V signal from the T/T cable 52, the VCR 56, or the other A/V devices 57 allowing both signals to be simultaneously displayed on the TV 58, the VCR 56 or the other A/V devices 57. Finally, the A/V connect module 66 can be used to transmit data such as order information to the cable (T/T) service provider 50 over a back channel 102 described below.

re-arrange digital data into coherent audio-visual displays. An optional A/V memory module 75 also coupled to the A/V bus 73 can be used to store A/V data before or after processing by the A/V processor 77 (using components such as video random access memory (VRAM) to hold, for example, a frame buffer equivalent to one $640 \times 480 \times 8$ -bit color image in memory).

The A/V encoder 78, coupled to the A/V bus 73 through the memory and bus controller 80, is used to convert digital A/V data from the A/V processor 77 or the optional A/V memory 75 into analog audio-visual signals which are routed to the TV 58, the VCR 56 or the other A/V devices through the A/V connect module 66. It is also contemplated that the A/V encoder 78 may be used to encode other data such as order information sent by the CPU 63 through the memory and bus controller 80 and the system bus 64 and transmit them to the service provider 50 through the A/V connect module 66 and a back channel 102 described below.

The CPU 63 is also coupled over the system bus 64 to a system memory 65 including both volatile and non-volatile memory components. The non-volatile part of system memory 65 includes read-only memory (such as ROM), which is used to store an operating system and playback software, fonts, sounds and the like used in the present

interface (SCSI) for accessing digital storage devices such as hard disks, a modem for exchanging digital data over telephone lines, or a serial port for controlling other devices over a wired connection. Another module presently being contemplated is a remote beeper button for locating the remote control device 60. Many consumers often misplace their remote control devices, and it is contemplated that the present invention may provide a function wherein a speaker on remote control 60 would beep while the beeper button is pressed until the user locates the remote control.

Referring now to Figure 3a, there is shown one possible electronic spectrum of signals provided by the cable T/T service provider 50 over the T/T cable 52 to the transceiver 54. As illustrated in Figure 3a, the spectrum includes at least one digital program listing channel 100, a plurality of back channels 102, and a plurality of standard analog TV channels 103. In addition, and as will be described more fully below, the spectrum includes pay-per-view digital channels 106, and further additional definable digital channels 108 offering a variety of interactive services, in addition to the general purpose or special channels or services particular to the specific application of the present invention.

As illustrated in Figure 3b, the digital program listing channel 100 provides data representing daily and weekly program

/ whereafter the sections that are most relevant to the users are stored in the system memory 65. By interleaving the current day's data with the weekly data, the daily data, the CPU module 62 can update the system memory 65 periodically and still provides quick access to the viewer, § without having to store all the received program/service information, thereby reducing the amount of system memory 65 required and the associated hardware cost.

Referring once again to Figure 3a, the back channels 102 are used to engage in a variety of transactions, such as ordering products, / 0 home banking services and pay-per-view movies, as will be described more fully below. In operation, any request by a user to view a pay-per-view movie or order a product is transmitted to the service provider 50 over at least one back channel 102 through the T/T cable 52. It is contemplated that as channel capacity increases, so will the number of ¶ back channels, allowing for broader band two-way communications such as telephone conversations or interaction with on-line networks.

Referring now to Figures 4a, 4b, and Figures 5a and 5b, two alternative embodiments of the remote control device 60 are shown in further detail. It is expected that the model shown in Figures 5a and 5b ¶ would be more commonly used. As illustrated in the figures, both embodiments of the remote control device 60 are comprised of four

and as will be described below, the user may desire to watch only sports programs, only news programs, or the like. As will be disclosed, the categories button 140, and the list button 138 operate in concert to provide listings of selected categories, such as sports or news programs, on the TV 58. The mark button 142 permits the user to mark programs for reminders, later recall, or switching between programs which have been selected using the mark button 142. A jump button 132 lets the user switch to the program that was last marked, then to the program that was marked before that, and so on, until all marked programs have been shown, looping back to the last marked program again. As shown in Figures 5a and 5b, the jump button 132 and the mark button 142 are placed side by side together on the dividing line between the first and second control button groups 115 and 134 to emphasize their interrelation.

Also provided with the interactive control button group 134 is a pointing device consisting of an up arrow button 145, a down arrow button 146, a left arrow button 148, and a right arrow button 150. For example, if the user is viewing a program/service listing through the use of list button 138, and desires to scroll up or down within the listing, the up arrow button 145 and the down arrow button 146 are utilized. In addition, a center select button 155 is provided for permitting the user to select one of several choices, represented by words or icons in graphic

being programmed to record the particular show highlighted in the program listing. Pressing the menu button 172 displays icons for all the A/V devices 57 currently connected to the transceiver 54 and allows users to select another device with the arrow buttons. Pressing the center select button 155 displays the output of that device and lets the user control that device.

The fourth control button group is the numeric keypad panel 176, which permits the user to directly enter channel numbers to be viewed on the TV 58 by pressing a single, double or triple digit number, followed by the ok button 178 (Fig. 5a). For the remote control device 60 shown in in Fig 4b, the user would depress the select button 155 after entering values using the keypad 176. In addition, the numeric keypad 176 may be used by the user to enter a personal identification number ("PIN"), to be transmitted to the service provider 50 through the A/V connect module 66 for payment of pay-per-view movies, products and the like.

In addition to the control button groups, both embodiments comprise a transmitter (not shown) for transmitting signals to the audio-visual system. Additionally, the model illustrated in Figures 5a - 5b is further provided with a talk button 181, a microphone 179, a speaker 182 and a receiver (not shown). The talk button 181 when depressed allows

Full Screen Viewing Function

Referring now to Figure 6, there is shown a representative full screen audio-visual program displayed on the screen 180 of the TV 58. By depressing the channel up/down buttons 130 on the remote in Figures 4a and 4b, (or by depressing the up and down arrow buttons 145 and 146 on the remote control device in Figures 5a - 5b), users can switch channels as is commonly done with regular TV remotes. As the user selects a channel to view using the remote control device 60, a graphic overlay panel 185 is displayed in the lower right hand portion of screen 180. As illustrated, the graphic overlay panel 185 includes the channel number currently being viewed 186 along with the channel logo and identifier 188. Additionally, a marking identifier 189, such as a check mark, is also displayed, as will be described, to indicate that the program has been marked through the use of the mark button 142 previously discussed with reference to the remote control device of Figures 4a, 4b, and Figures 5a and 5b.

button 150, and the down arrow button 146, of the remote control device 60 can be depressed to cause additional information to be depressed. An up arrow 205 is also displayed, but is not highlighted, to indicate that no additional information will be displayed if the up arrow button 145 is depressed.

Referring now to Figure 8, which illustrates a new graphic overlay panel 190 displayed in response to the user having depressed the right arrow button 150 on the remote control device 60 while using the information function. The transceiver 54 provides additional information on the currently viewed program. As illustrated, an additional page of information on the program currently viewed is displayed. For example, additional guests on the show "Showbits This Month" include "Madeline, Harold Black and Harmer". Referring now to Figure 9, which illustrates another new graphic overlay panel 190 displayed in response to the user having depressed the right arrow button 150 again. A third page of information is displayed on the screen 180 relating to the currently viewed program "Showbits This Month". It will be noted that the currently viewed television program ("Showbits This Month" in this example) continues to be viewed in the main portion of the screen 180, while different graphic overlay panels 190 are superimposed over the lower third portion of the screen 180.

information relating to John Smith is provided in the graphic overlay panel 190. It will also be noted that in Figure 10, the down arrow 210 is highlighted, indicating that yet another information track is available.

Still referring to Figure 10, it will be noted that a down arrow 210 is shown. By depressing the down arrow button 146 on the remote control device 60 once again, an Info Mart track information track as shown in Figure 11 is displayed by CPU 63 in the graphic overlay panel 190. As illustrated, the Info Mart information track provides the viewer with the opportunity to purchase products, services, programs and the like related to the program which is currently being viewed (in the present example, the baseball game "Saint Louis at San Francisco"). The information track disappears when the info button 136 is pressed again.

While the information has been described with the left and arrow arrow buttons 148 and 150 causing different pages of an information track to be displayed, and the up and down arrow buttons 145 and 146 causing different information tracks to be displayed, it is contemplated that the information displayed may be related to each other in other application dependent manners. It is further contemplated that this information function can also be used with audio-visual programs or services other than TV shows, in particular

List Function

Referring now to Figure 12, the list function of the present invention will be described. While viewing a television program displayed on the TV 58, the user may depress the list button 138 on the remote control device 60 to obtain a program/service listing for the current date and time during which the user is watching television. As shown in Figure 12, upon depressing the list button 138, a program/service listing 220 is displayed for the current date and time at which the viewer has depressed the list button 138. As illustrated, programs/services currently available for viewing and interaction are identified by their channel numbers, channel name identifiers (for example, Channel 10, NTV), and by titles of the programs/services. In the event that the program/service listing includes two programs for a given time interval, then the names of both programs are displayed. For example, in Figure 12, Channel 10 is NTV which beginning at 8:00 p.m. is showing a program entitled "Rock Today", and beginning at 8:10 p.m. is showing a program called "Party Time". In addition, as shown in Figure 12, a picture-in-picture window 250 continues to display the currently viewed program which the user was last viewing. Accordingly, the user may continue to view the currently selected program, and the current program/service listing simultaneously. By pressing the select button 155 in the current time slot, the user can view the currently highlighted

higher channel numbers previously displayed at the bottom part of the screen 180 will consecutively disappear. As illustrated in Figure 14, Channels 7 and 8 are now displayed, and Channels 19 and 20 are no longer displayed to the user. If the up arrow button 145 is now pressed instead, the highlighting will move down towards the higher channel numbers as illustrated in Figure 14. Notably, movement of the program/service listing and the highlighting in the present invention are specifically calculated to conform with an average person's expectations in using a television remote control. While the list function has been described with the down arrow button 146 causing highlighting to move towards the lower channel numbers, and the up arrow button 145 causing highlighting to move towards the higher channel numbers, it will be appreciated that the correspondence between the arrow buttons 145 and 146 and the highlighting movement may be implemented in other ways as best suits the anticipated user of the interface system.

Skipping now to Figure 16, a further feature of the list function of the present invention is illustrated. In the event the user depresses the right arrow button 150, the CPU 63 displays the next hourly time slot listing on the screen 180. In the example of Figure 16, the time slot for 9:00 - 10:00 p.m. is illustrated. It will be appreciated that, had the user depressed the left arrow button 148 three times, then the

Record Function

Referring now to Figure 18, which illustrates a program/service listing displayed in response to the user having continuously depressed the right arrow button 150 on the remote control device 60. The exemplary program/service listing displayed is for Saturday, October 17 beginning at prime time (6:00 p.m.). The up and down arrow buttons 145 and 146 on the remote control 60 are then used to highlight the program "Specials Tonight". Assume now the user desires to record the exemplary program "Specials Tonight". By pressing the record button 162 on the remote control device 60, a record panel 259 is displayed by the CPU 63 on the screen 180, confirming the title and length of the program to be recorded, along with a highlighted select ("bull's eye") icon as shown in Figure 18. It is contemplated that other functions can be included in the record panel 259, such as a function for selecting different VCRs or other A/V recording devices, a function for selecting different tapes or recording media, and/or a function for selecting how often the recording is to take place (once, weekly, daily). Once the select button 155 is pressed, the program listing is redisplayed without the record panel 259. A record icon 260 is displayed on the screen 180, as shown in Figure 19. The "Specials Tonight" program which will begin on Saturday, October 17, will then be recorded automatically. In the event the viewer changes his mind and does not desire to record the

Mark and Jump Functions

Skipping now to Figure 15, the mark function of the present invention and its operation will be described. Shown in Figure 15 is a program listing reflecting Channel 10 (NTV) having been selected using the up and down arrow buttons 145 and 146 on the remote control device 60. Assume now the current time is 8:08:30 p.m. In accordance with the teachings of the present invention as described earlier, the program "Rock Today" would be highlighted on the screen 180. The program "Party Time" may be highlighted by the viewer by pressing the right arrow button 150. The mark function may then be initiated by pressing the mark button 142 on the remote control device 160. As illustrated in Figure 15, a mark identifier 252 is displayed adjacent to the selected program (in the present example, "Party Time"). Skipping again to Figure 20, a reminder box 254 is displayed on the screen 180 at the time the program "Party Time" begins (in the present example, 8:10 p.m.), regardless of what channel is currently being viewed then by the user on TV 58. It should also be noted that programs playing live in a current time slot can be marked while displayed in full screen by depressing the mark button 142. This causes a mark identifier 189 to be displayed in the graphic overlay panel 185, as shown in Figures 6 and 21.

Categories Function

Referring now to Figures 22 - 32, the categories function of the present invention will be described. To initiate the categories function of the present invention, the categories button 140 is depressed on the remote control device 60. As illustrated in Figure 22, the CPU 63 displays a categories graphic overlay panel 300 which is superimposed over the currently viewed program on screen 180. A plurality of categories are identified by representative icons. The first category which is selected by default is the "all" category 302, and is highlighted around the border. The "all" category 302 refers to all currently available programs/services being transmitted by the service provider 50. By depressing the right arrow button 150 or left arrow button 148 on the remote control device 60, other categories may be highlighted. For example, by depressing the right arrow button 150, the next category "favorites", as indicated by a star icon 305, is highlighted (See Figure 23). Similarly, by depressing the right arrow button 150 again, a movies icon 310 is highlighted. By depressing the right arrow button 150 another time, a sports icon 315 is highlighted (see Figure 24), and so on. Additional categories may include a news icon 312 and a music video icon 313. However, it will be appreciated that many other categories can be displayed. By repeatedly pressing the right arrow button 150, the user

and the channel identifier 188 (in the example of Figure 26 "Sportstime") in the graphic overlay panel 185.

Referring now to Figure 27, if the user has selected the category of sports (icon 315), and depresses the list button 138, a program/service listing 360 of currently available sports programs is displayed on screen 180. It will also be noted that the currently viewed sports program will continue to be displayed in a picture-in-picture window 365. As previously discussed, with respect to the list function, programs which are shown during half hour intervals (See Figure 27 "Windsurfing" and "Basketball") are identified and may be individually selected using the remote control device 60.

Referring now to Figure 28, which illustrates a program listing with the sports icon 330 in the category overlay panel highlighted, displayed in response to the user having pressed the list button 138, and then presses the categories button 140. Assume now the user desires to break down the main sports category into finer sub-categories such as baseball, football, basketball, hockey, etc. By depressing the down arrow button 146 on the remote control device 60, the user causes the CPU 63 to select a default sport sub-category (baseball in this example) and display a plurality of sports sub-category icons against the categories overlay panel 300 as illustrated in Figure 29. The default sports sub-category icon 315 is

program listing 362 of programs most frequently watched by the user as determined by the CPU 63 from previous monitoring of the user's viewing habits. In the normal course of operation, the CPU 63 monitors programs which are most frequently viewed and compiles a prioritized list of those frequent programs for each time slot, which list is stored in the rewritable non-volatile part of the system random access memory (such as SRAM) 65.

In the presently preferred embodiment, if a viewer views a television program for more than 10 minutes, the current program and channel identifiers are compared to frequent programs already stored in system memory 65 for that particular time slot, and an updated list of frequent programs is created by CPU 63 and stored in the system memory 65. In the event there are no frequent programs stored in the system memory 65 for any particular time slot, then a general list of most frequently watched programs is retrieved from the system memory 65. It is anticipated that the majority of frequent programs will be stored in time slots corresponding to prime time, or during daytime television hours.

By pressing the right arrow button 150, the user can move the highlighting from the "frequent" programs sub-category icon 318 to the "marked programs" sub-category icon 319, as shown on Figure 32.

While the present invention has been described with the categories function having different effects on the displayed image when used during full screen display and when used in conjunction with list function, it will be appreciated that the present invention also may be practiced with the categories function having consistent effect on the displayed image in either situation, as desired.

perceives each of the 12 small picture-in-picture windows as sequential representative images of every N frames per window. However, the picture-in-picture window 375 represents a full motion display of the currently selected program, provided that a second TV tuner 67 is included within the A/V connect module 66.

Additionally, in the preferred embodiment of the present invention, it is contemplated that the user is able to view the pix display 381 by category by pressing the categories button 140 and selecting a particular category, such as favorites or movies. For example, the pix display 381 illustrated in Figure 33 is comprised of only favorite programs, as the user had previously selected the favorites category. Had the user selected the "marked" sub-category, only marked programs would be displayed on the pix display 381, allowing users to easily add or delete programs in the pix display 381 by using the mark button 142. If no categories have been selected (which is equivalent to selecting the "all programs" category), then the pix display 381 displays the 12 programs nearest to the last selected program. Similarly, pressing the info button 136 would display the graphic overlay panel 190 shown in Figure 7 for program information.

Referring now to Figure 34, which illustrates the selection of a different pix program to be viewed in the central picture-in-picture

It is contemplated that pressing a single, double or triple digit number on the numeric keypad 176 , followed by the ok button 178 of the remote control 60, will display the corresponding pay-per-view channel, along with the 12 nearest channels. It is also contemplated that this pix function can be used with audio-visual programs and services other than TV shows, in particular when the menu button 172 is used to display the output of the VCR 56, the CD 70, a hard disk or one of the other A/V devices 57 connected to the A/V transceiver 54.

/ program sourced from the VCR 56 is displayed in full screen. Thereafter, the user can press the play button 168 on the remote control device 60 to cause the CPU 63 to instruct the VCR 56 through the A/V connect module 66 or the IR control 82 to playback a previously recorded program on the VCR 56. Similarly, the user can press the stop arrow button 166, the rewind button 164, and/or the fast-forward button 170 on the remote control device 60 to further control the program sourced from VCR 56. It is contemplated that the CD ROM module 70 and some of the other A/V devices 57 including other CDs, VCRs, laser disc players, hard disks, telephones, answering machines, as well as transmitting devices connected to voice mail, electronic mail and various on-line services can be similarly selected and controlled through the use of the menu function, as illustrated in Figure 36.

corresponding sequence of buttons, as described earlier. It is further contemplated that the remote control device 60 in conjunction with the TV 58 and a camera can be used as a video telephone for video conferencing and the like, wherein having engaged a telephone line (via the menu function) the user speaks directly into the remote control device 60 as if it were a standard telephone.

user, such as the title, the production company, a brief description of the movie, the rating and the total length. If the user desires to watch the pay-per-view movie, he/she depresses the right arrow button 150 once again to highlight the ticket icon 388, as illustrated in Figure 41.

As shown in Figure 41, upon the selection of the highlighted "ticket" icon 388, the CPU 63 generates and displays on the screen 180 a request for the user to input a "movie pass" password using the numeric keypad 176 of the remote control device 60. After entering the personal identification number (PIN) using the numeric keypad 176, causing a confirmation sound to be played and confirmation symbols such as asterisks to fill in a blank confirmation display 425, the user depresses the ok button 178 or the select button 155 on the remote control device 60 to order and view the pay-per-view movie. As shown in Figure 42, transceiver 54 then displays the ordered program if it is available, or displays a message informing the viewer that the pay-per-view movie will begin screening within X number of minutes. In operation, depressing the ok button 178 or the select button 155 subsequent to the entering of the movie pass personal identification number (PIN) results in the CPU 63 providing a signal to the cable service provider 50, over the T/T cable 52 using one of the back channels 102 (See Figure 3a). It will further be appreciated that during the waiting period prior to the transmission of the pay-per-view movie, additional

Home Shopping Interface

The present invention includes one possible home shopping interface, which will now be described. In Figure 43, a channel identified as "SHP" or "TV Shop" represents a dedicated home shopping service within the electronic spectrum illustrated in Figure 3a. It will be noted that although in its present embodiment, TV Shop is presented as a television channel, it could also be presented as an on-line service through a transmitting device connected to the T/T cable 52. In the current embodiment, the selection of the TV Shop service results in a continuous full-motion video display of various paid-for commercials or advertising messages. As shown in the representative screen of Figure 44, a TV Shop icon is displayed along with a blinking select icon (or right arrow icon) in a graphic overlay panel 400, at the start and end of each advertisement, prompting users to press the select button 155 (or right arrow 150).

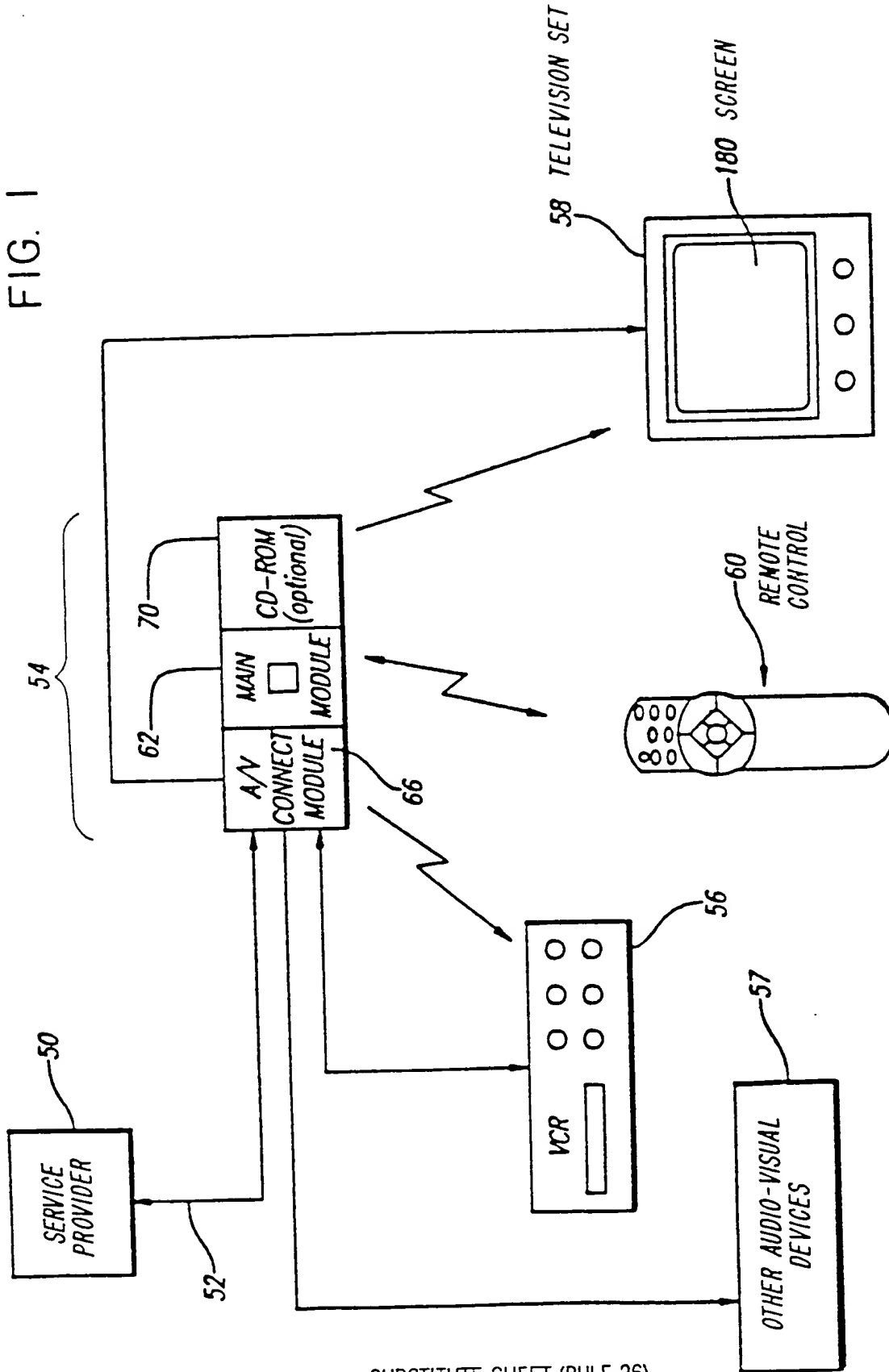
Referring now to Figure 45, by pressing the select button 155 (or the right arrow button 150), the user can view additional information relating to the advertisements shown in the full motion video section of the TV Shop. In the example of Figure 45, it will be noted that a listing of the advertisers is provided, in which the advertisers whose commercial was playing last is highlighted. Through the use of the up arrow button

button 155 (or the right arrow button 150) to highlight the order icon 409. As illustrated in Figure 49, a personal identification order number window 420 is displayed in which the user (using the numeric keypad 176) inputs a personal identification number (PIN). After entering the personal identification number (PIN), the ok button 178 or select button 155 is depressed to order the product. In the presently preferred embodiment, once the personal identification number (PIN) of the user is entered into the system of the present invention and the ok button 178 or the select button 155 is depressed, a signal is provided by the CPU 63 to the service provider 50, using one of the back channels 102 (See Figure 3)a. As illustrated in Figure 50, a confirmation of the order, along with a delivery time is displayed to the user. It will also be appreciated that other home shopping interface variants may be designed and implemented using the teachings of the present invention.

/ the user as having motion, color, sound and/or animation. Specifically, it will be appreciated that the present audio-visual user interface also includes an audio interface using a plurality of sound icons and backgrounds, which compliment the visual interface and are played
5 almost every time a function of the present invention is used, and which cannot be illustrated graphically here, but are part of the present invention. Due to the limitations of a written specification, the reader is referred to a videotape entitled "EZTV" submitted by the Applicants concurrent with the filing of the application on which this patent is
10 based.

provider and said storage means, and managing interaction with service offering of said AV program/service provider.

FIG. 1



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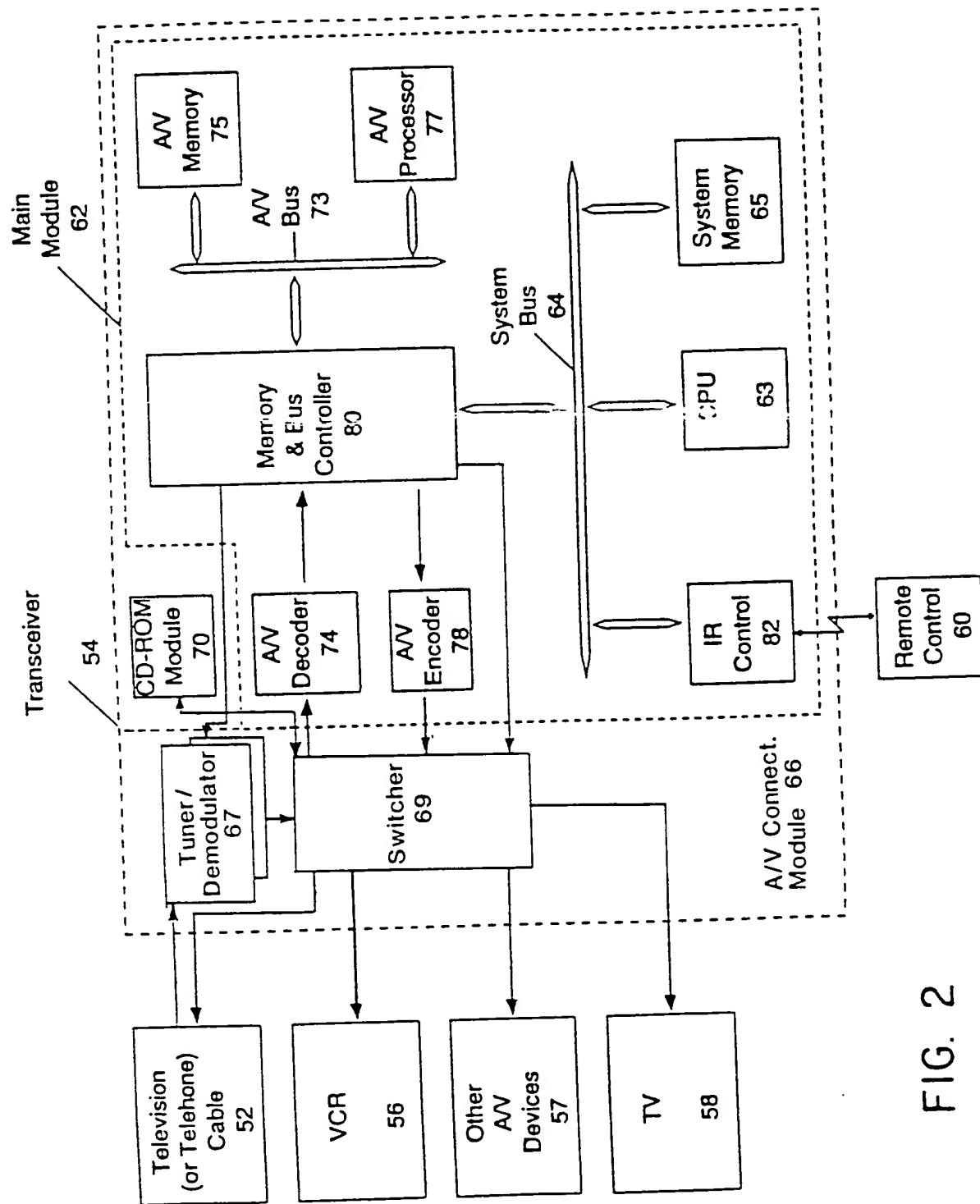
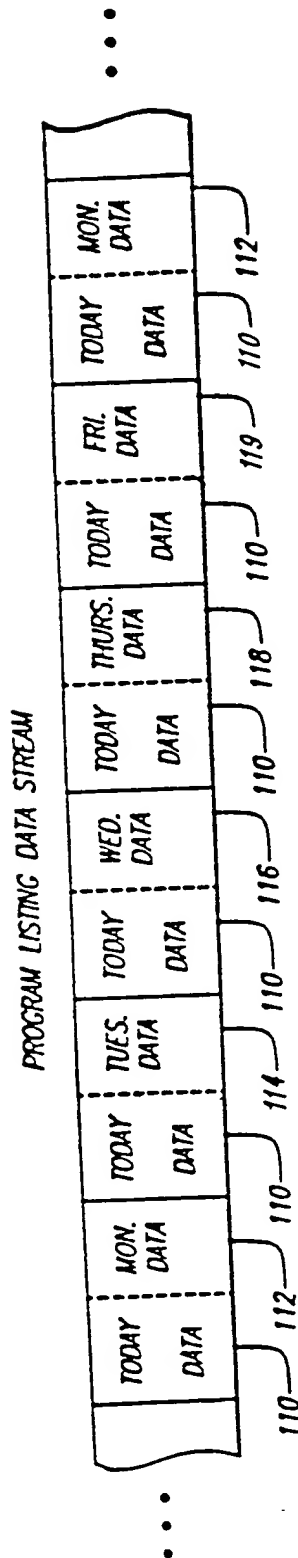


FIG. 2

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- TITLES OF PROGRAMS
- SHOW TIMES
- CAPTIONS
- LENGTH
- CATEGORIES/KEYWORDS
- CHANNEL NUMBERS

FIG. 3b

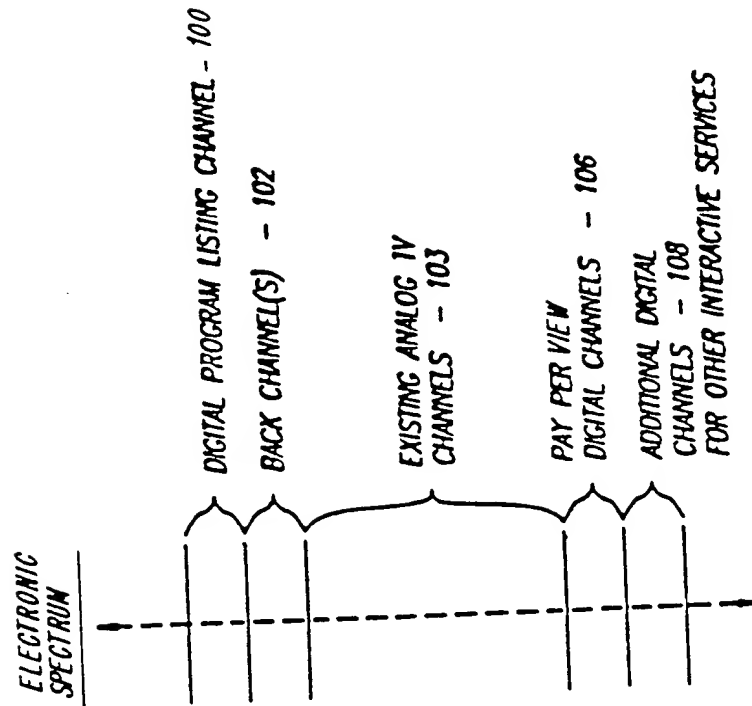


FIG. 3a

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FIG. 4a

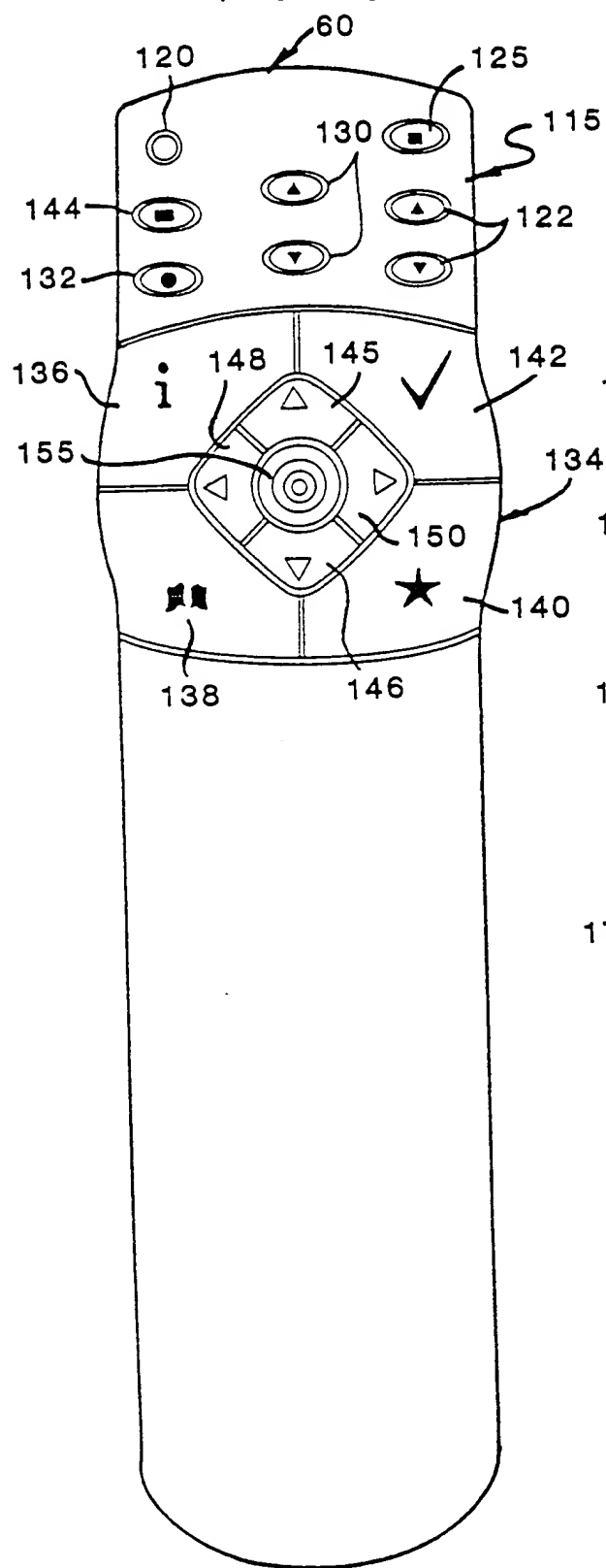
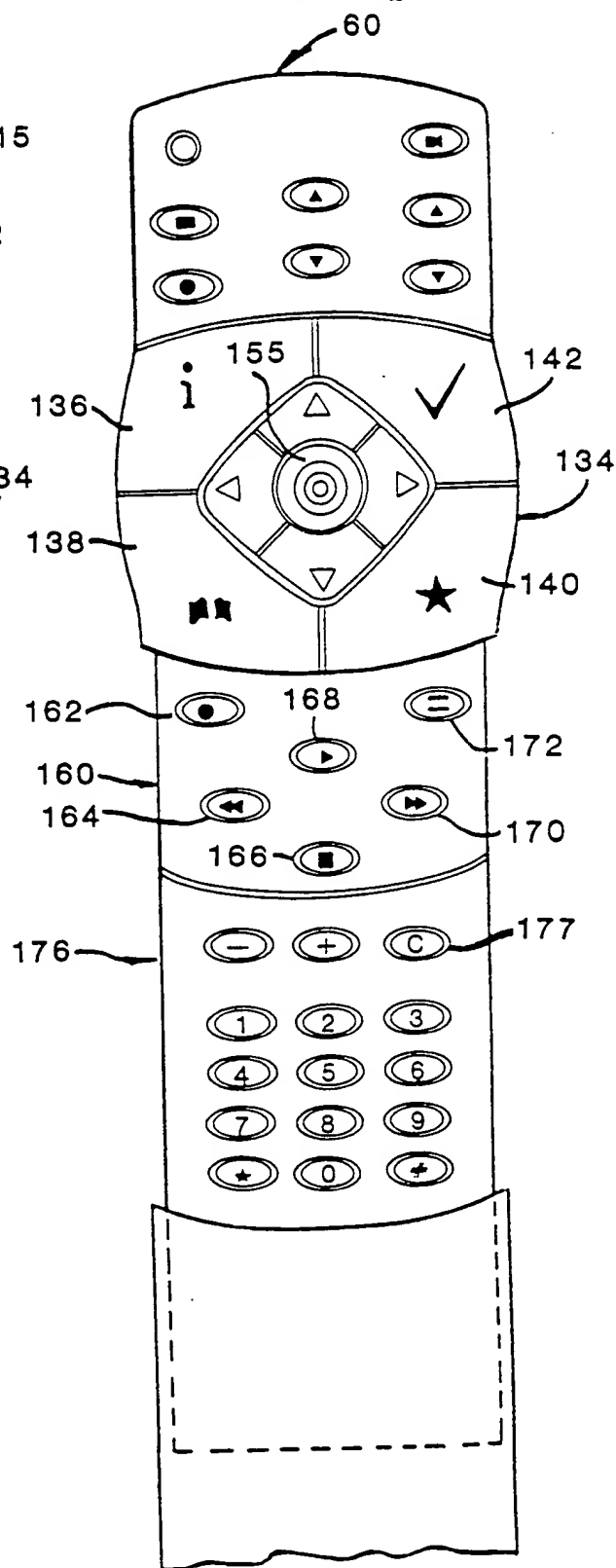


FIG. 4b



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FIG. 5a

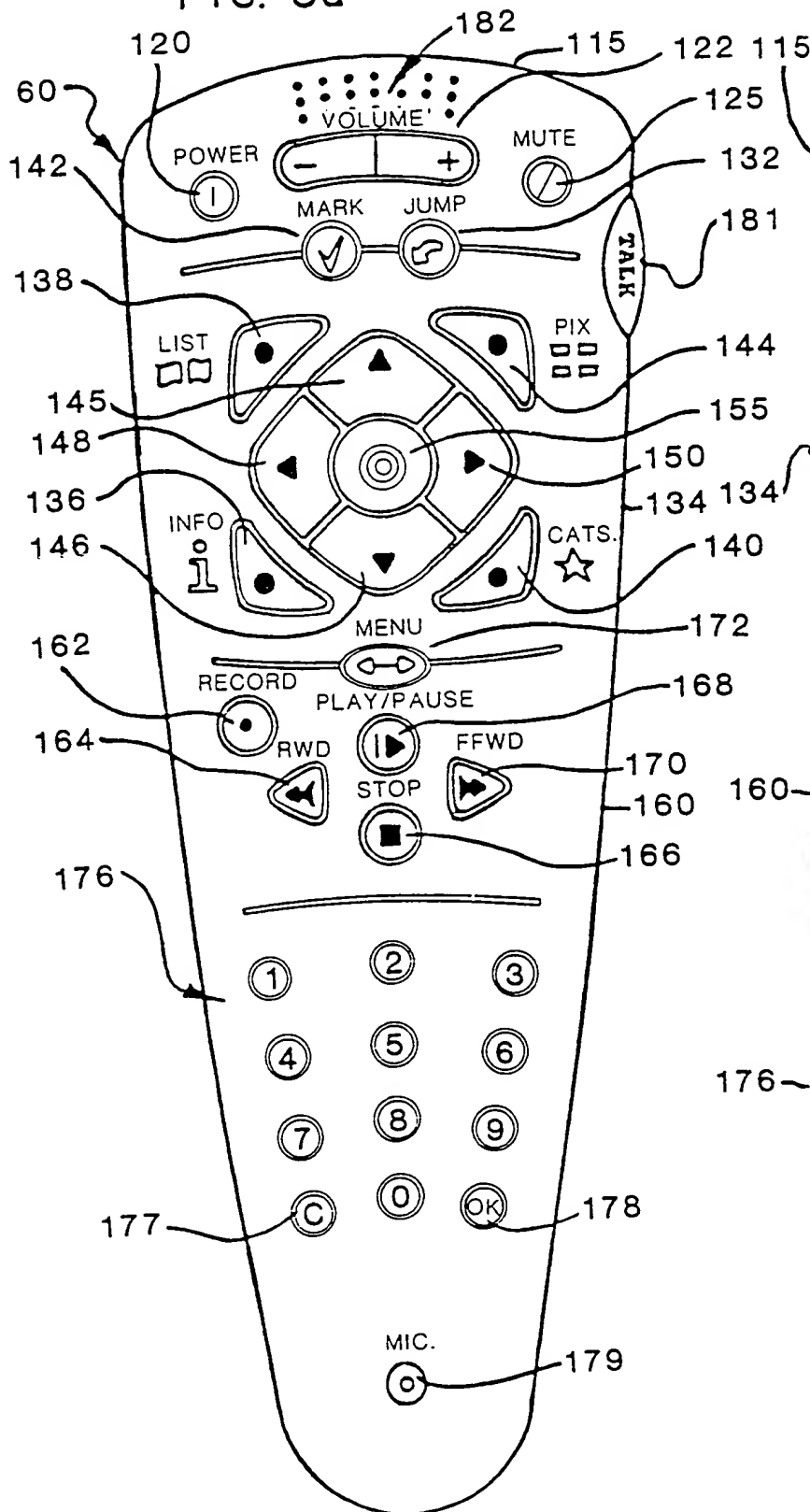
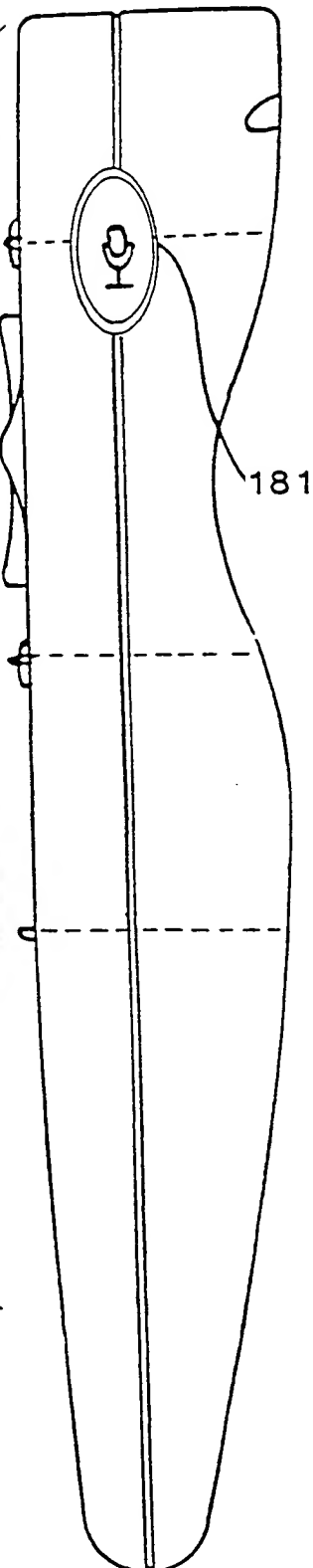
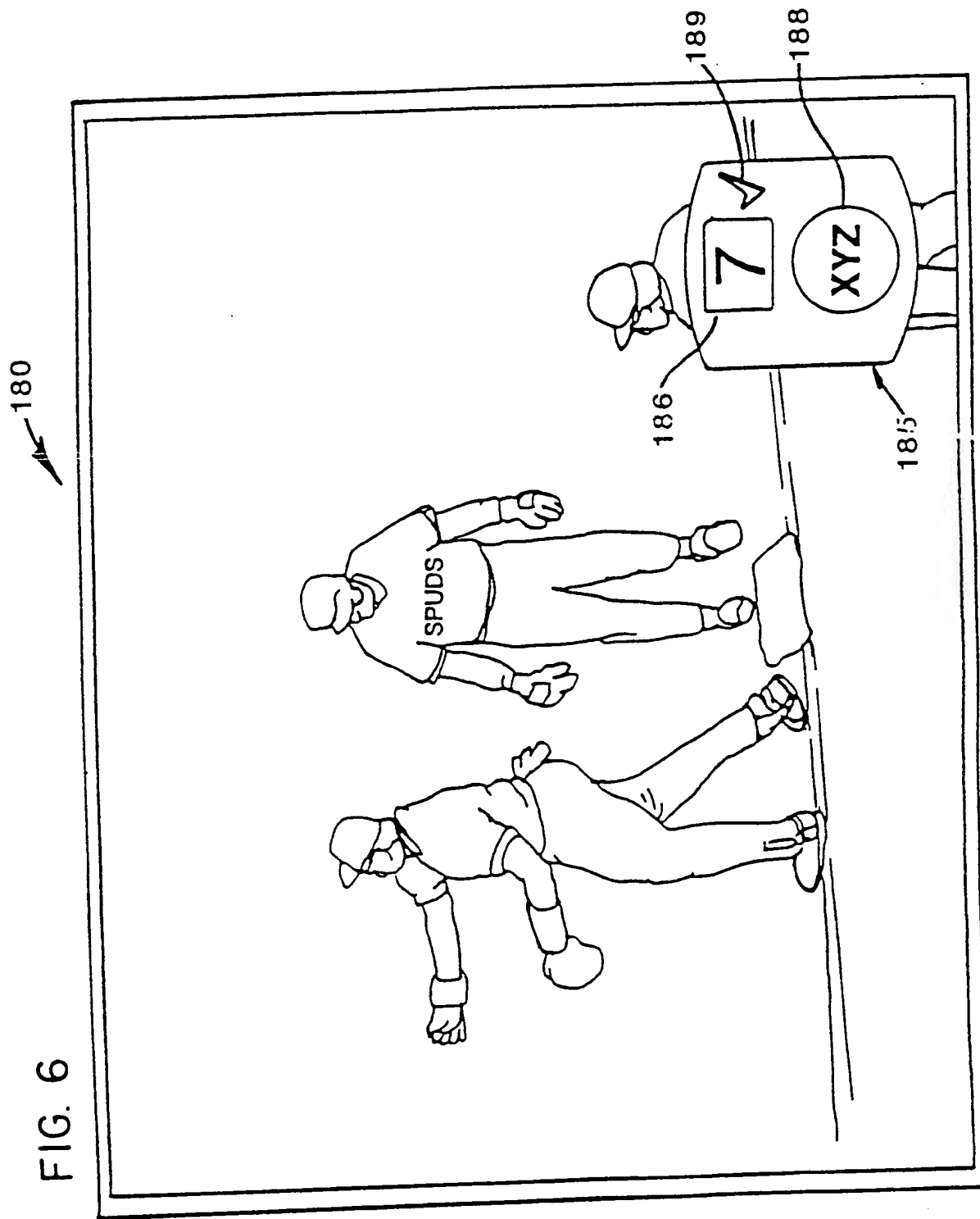


FIG. 5b





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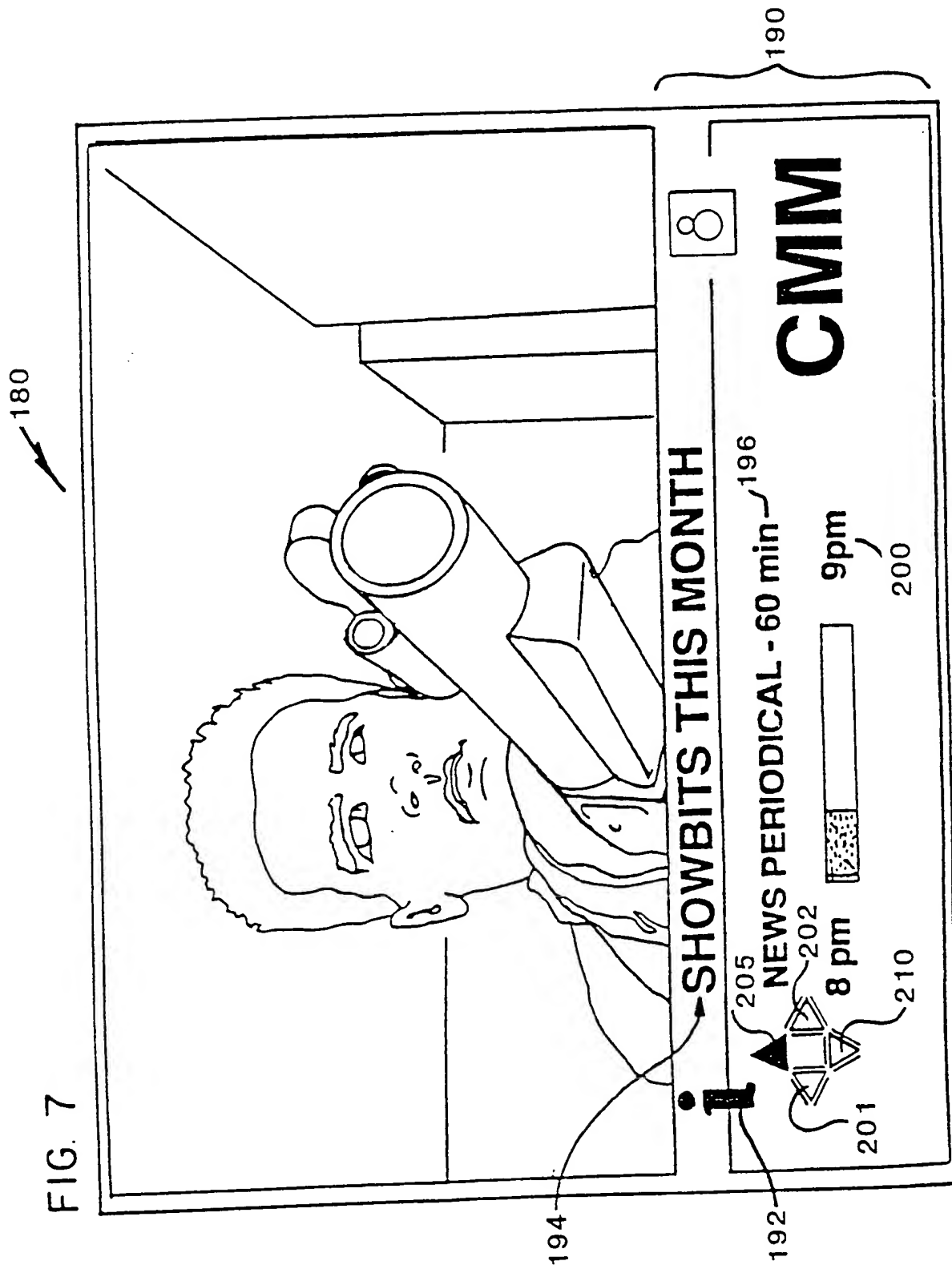
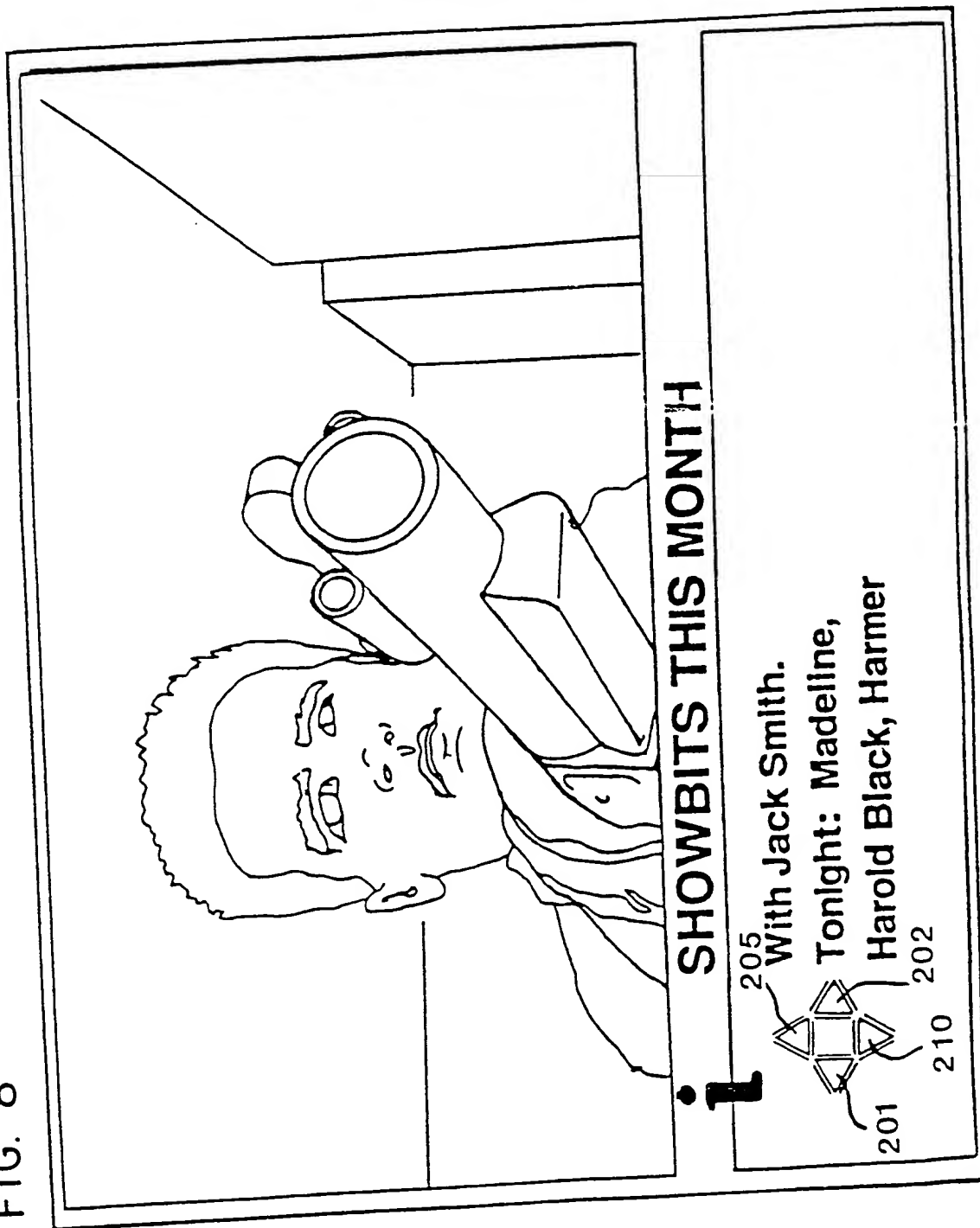
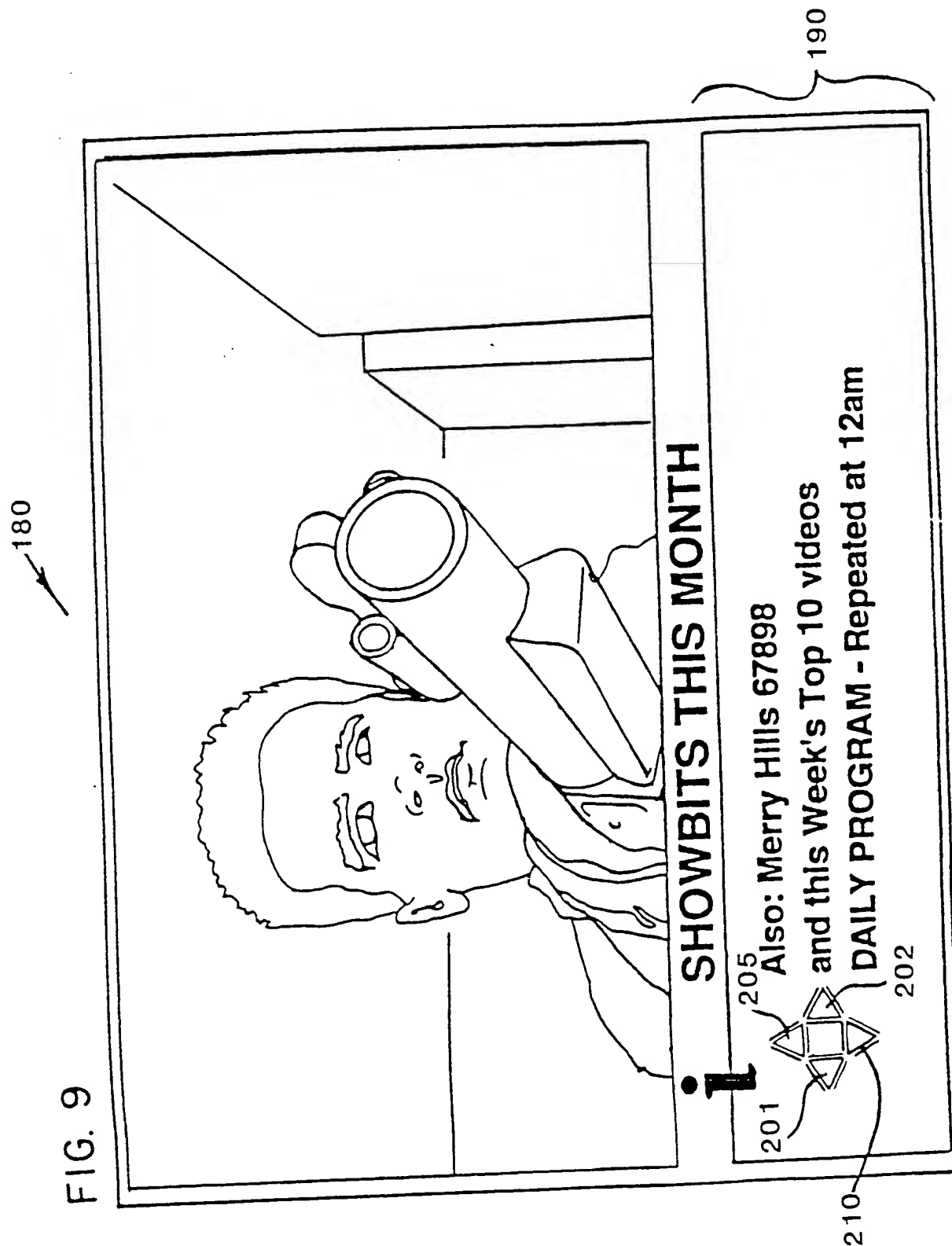


FIG. 7

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FIG. 8





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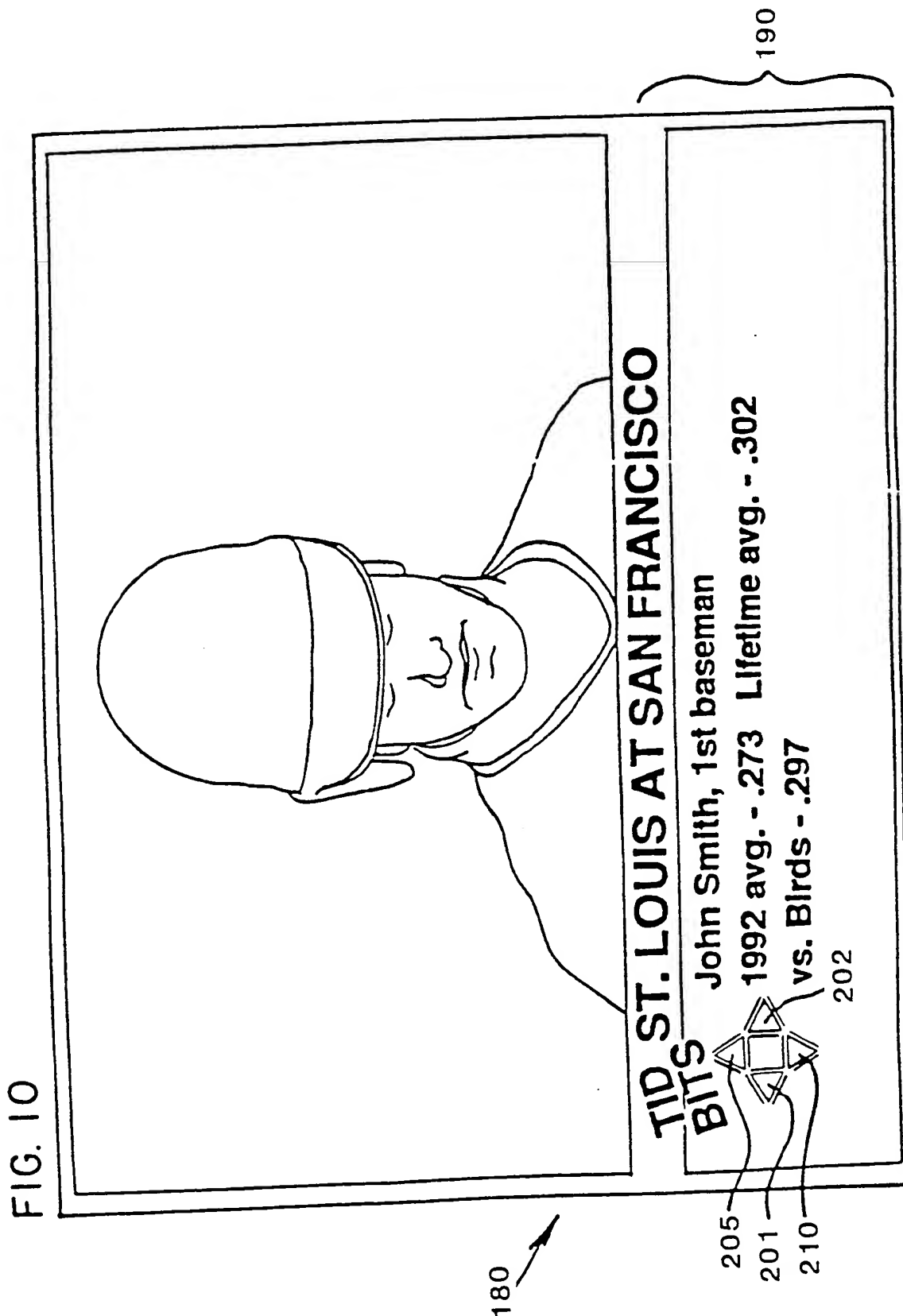
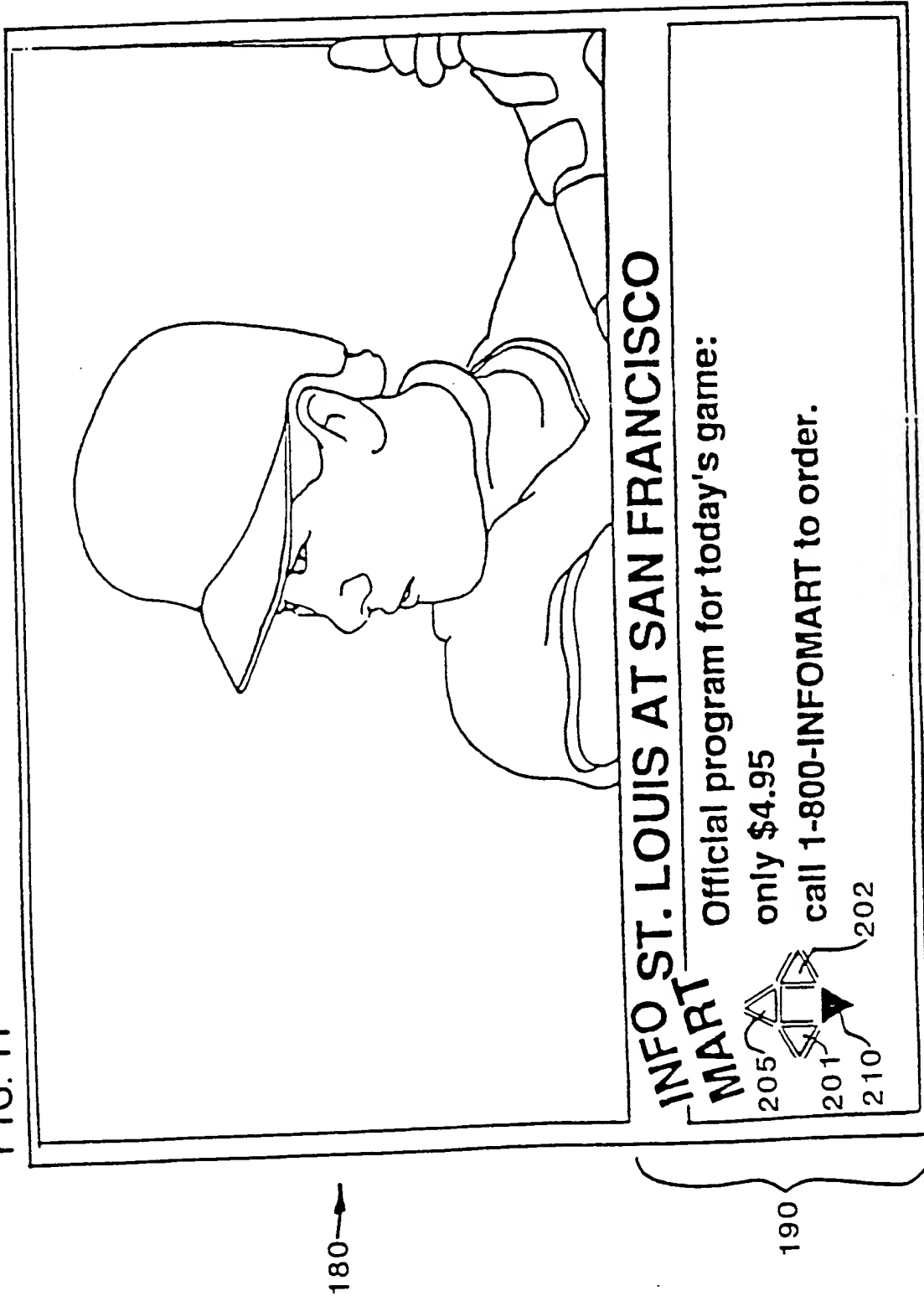
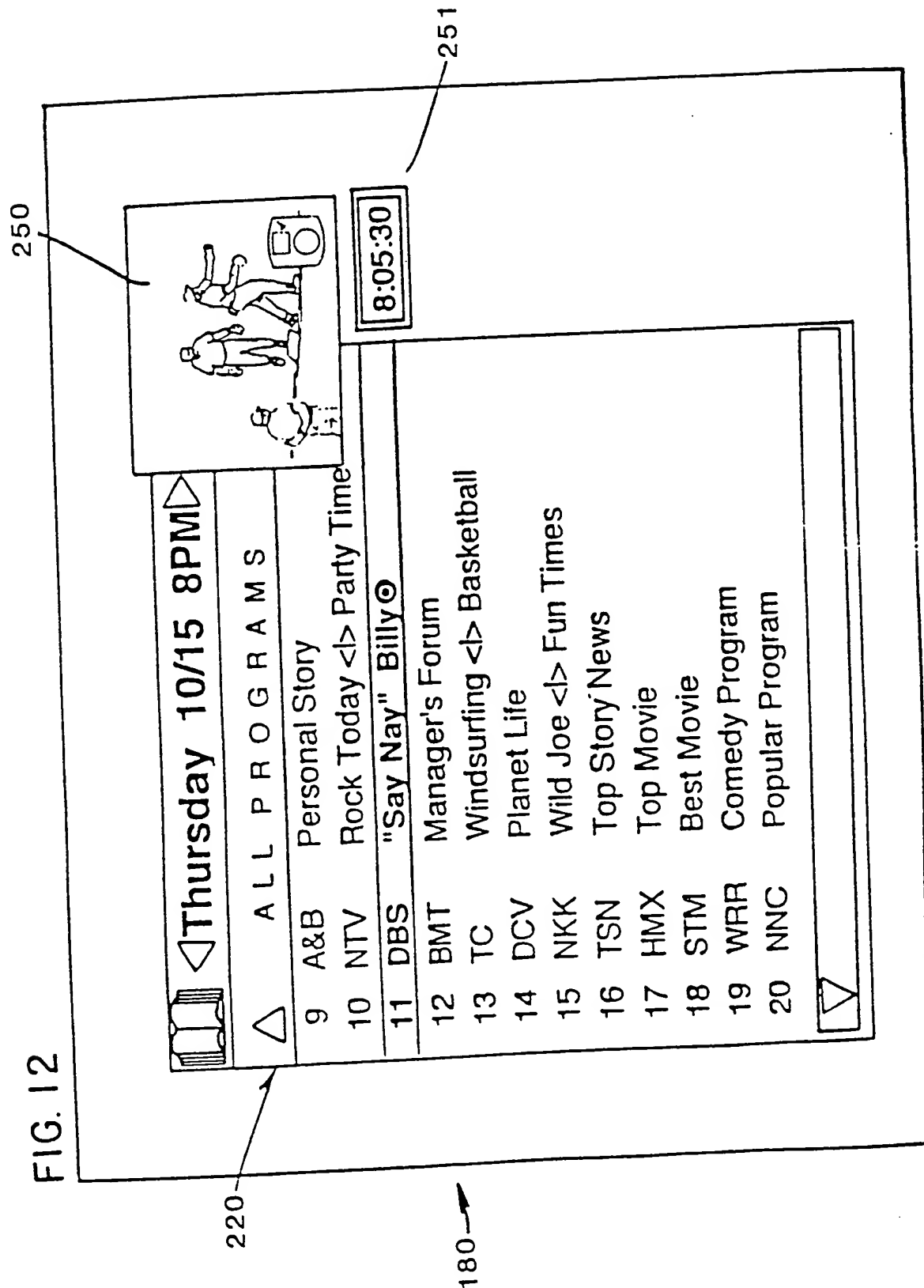


FIG. 11



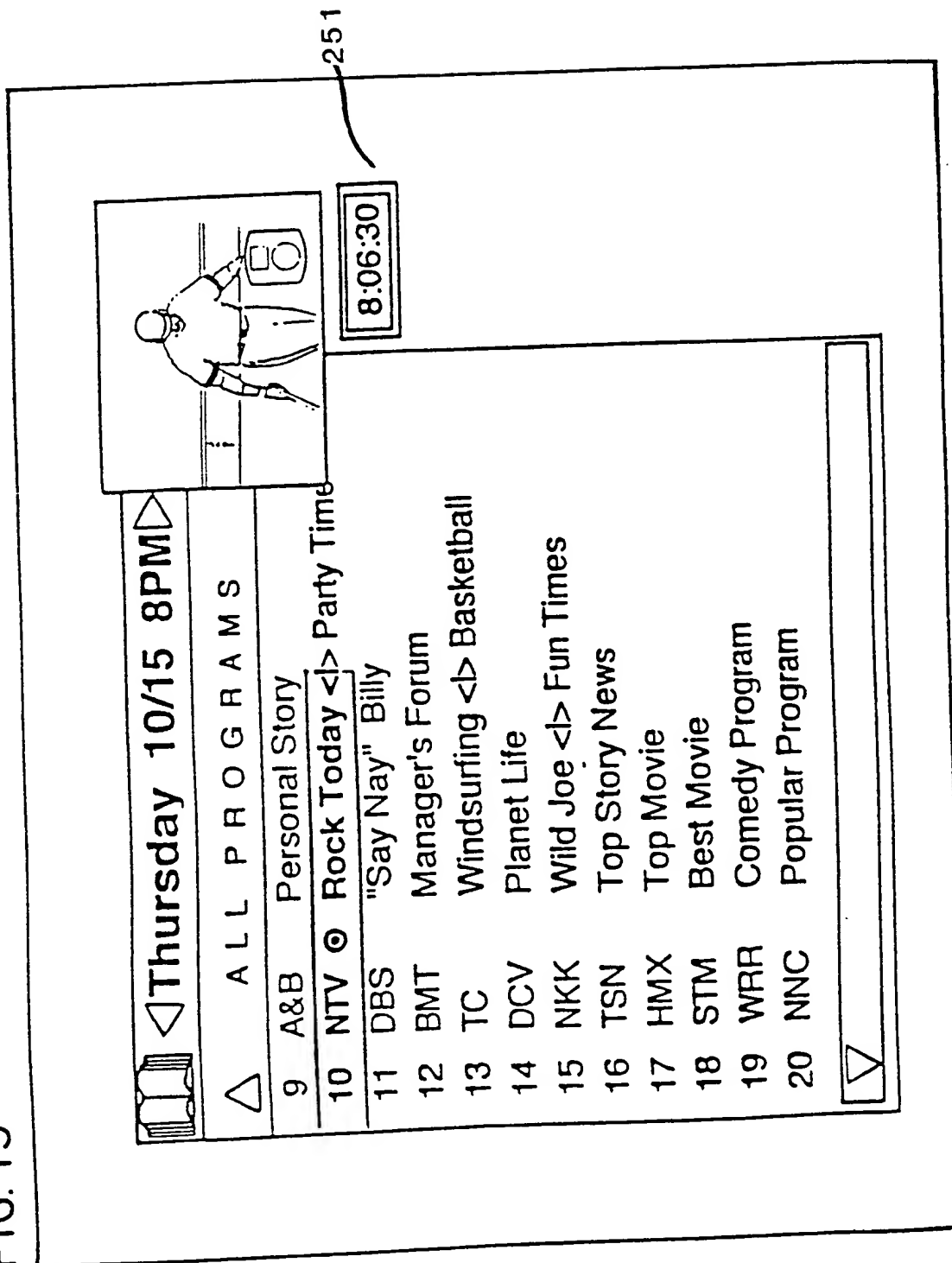
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FIG. 12



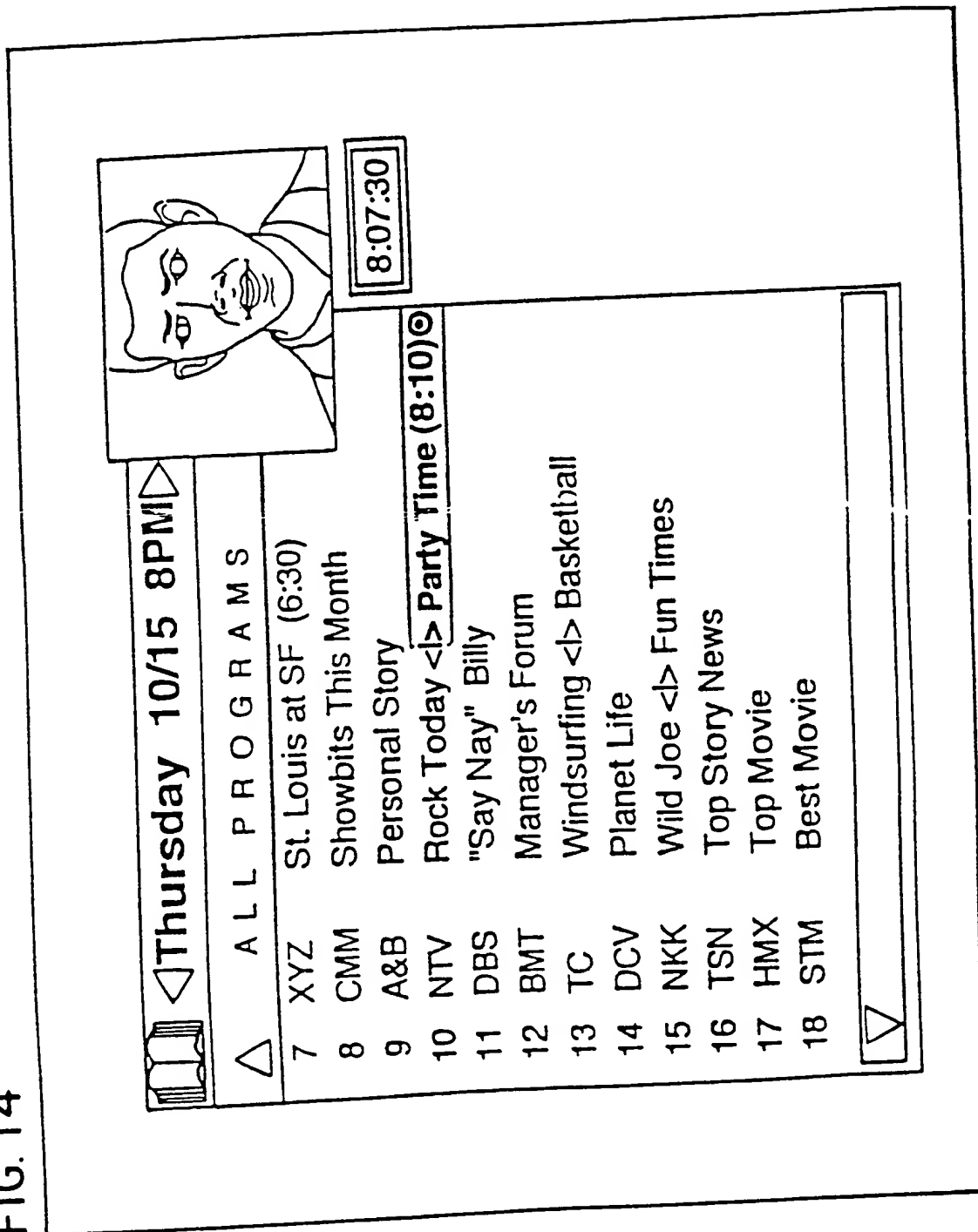
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FIG. 13



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FIG. 14

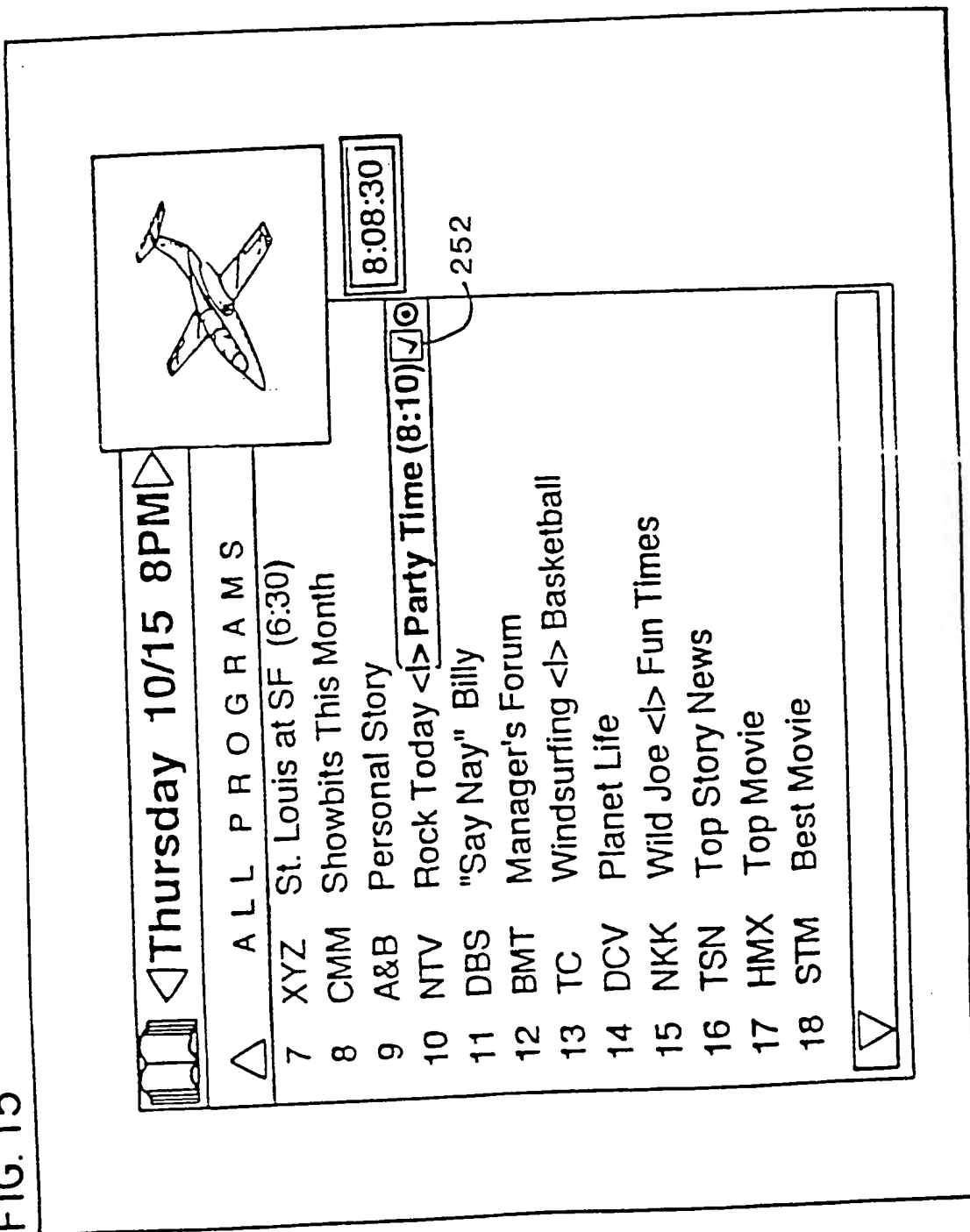


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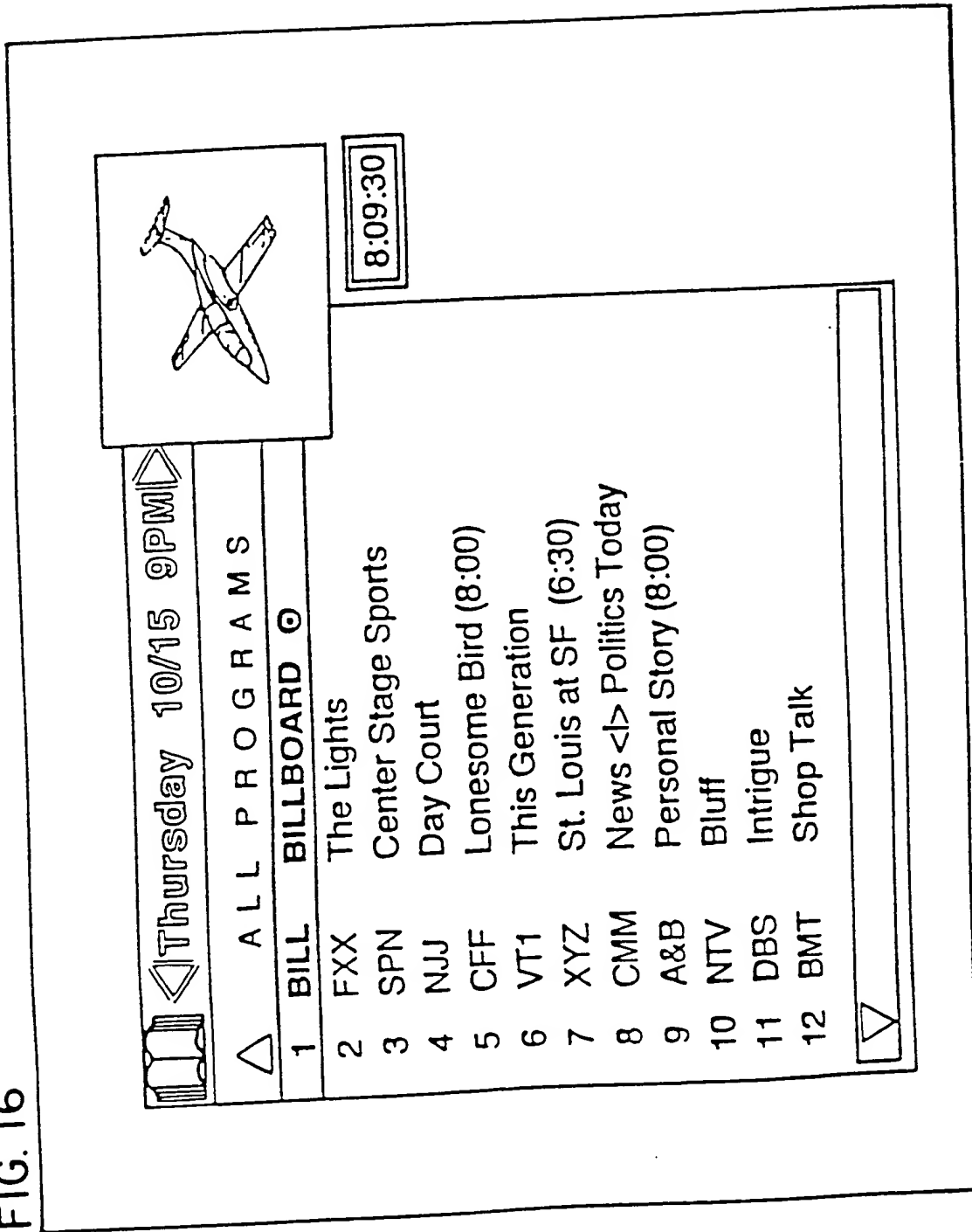
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FIG. 15



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FIG. 16

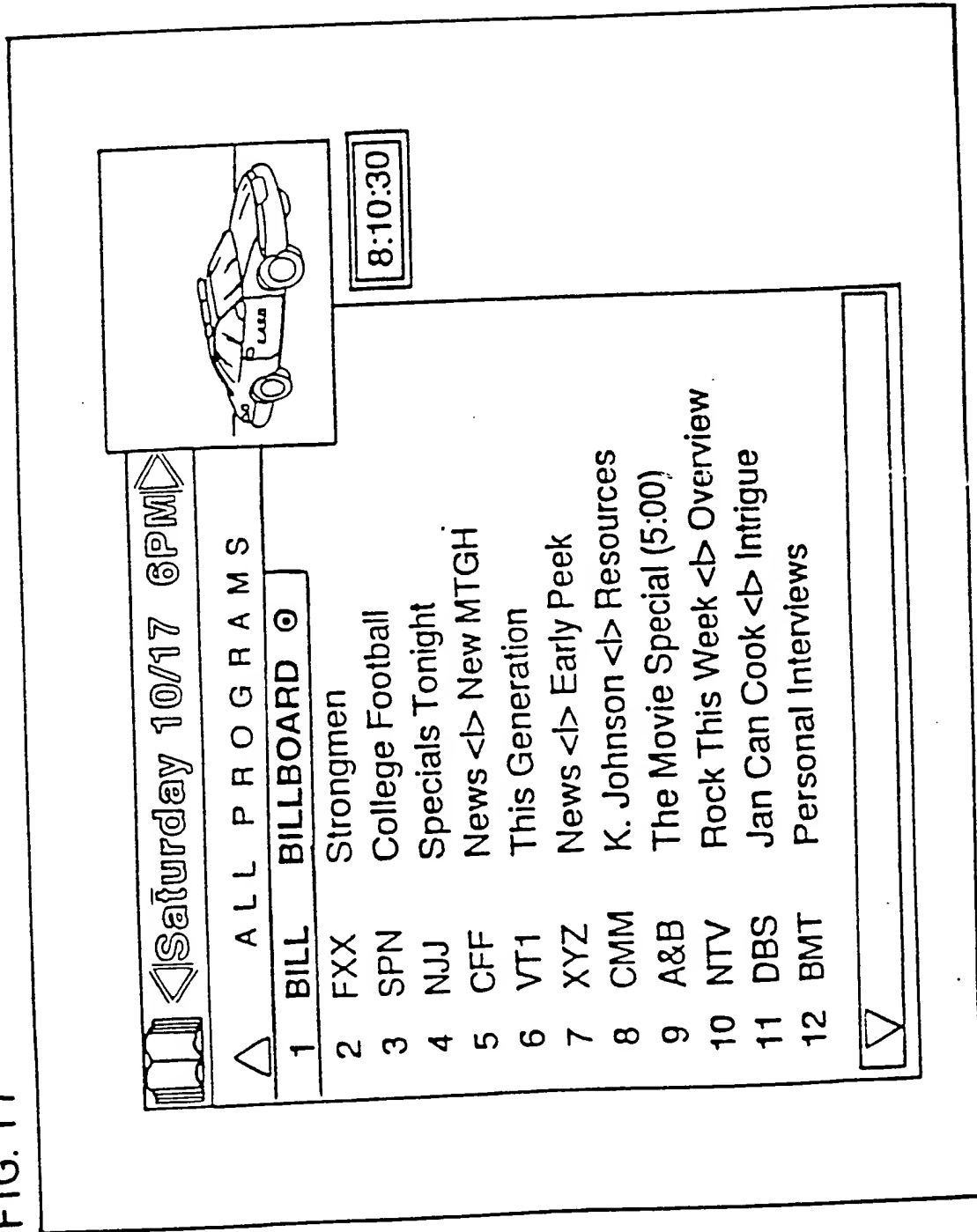


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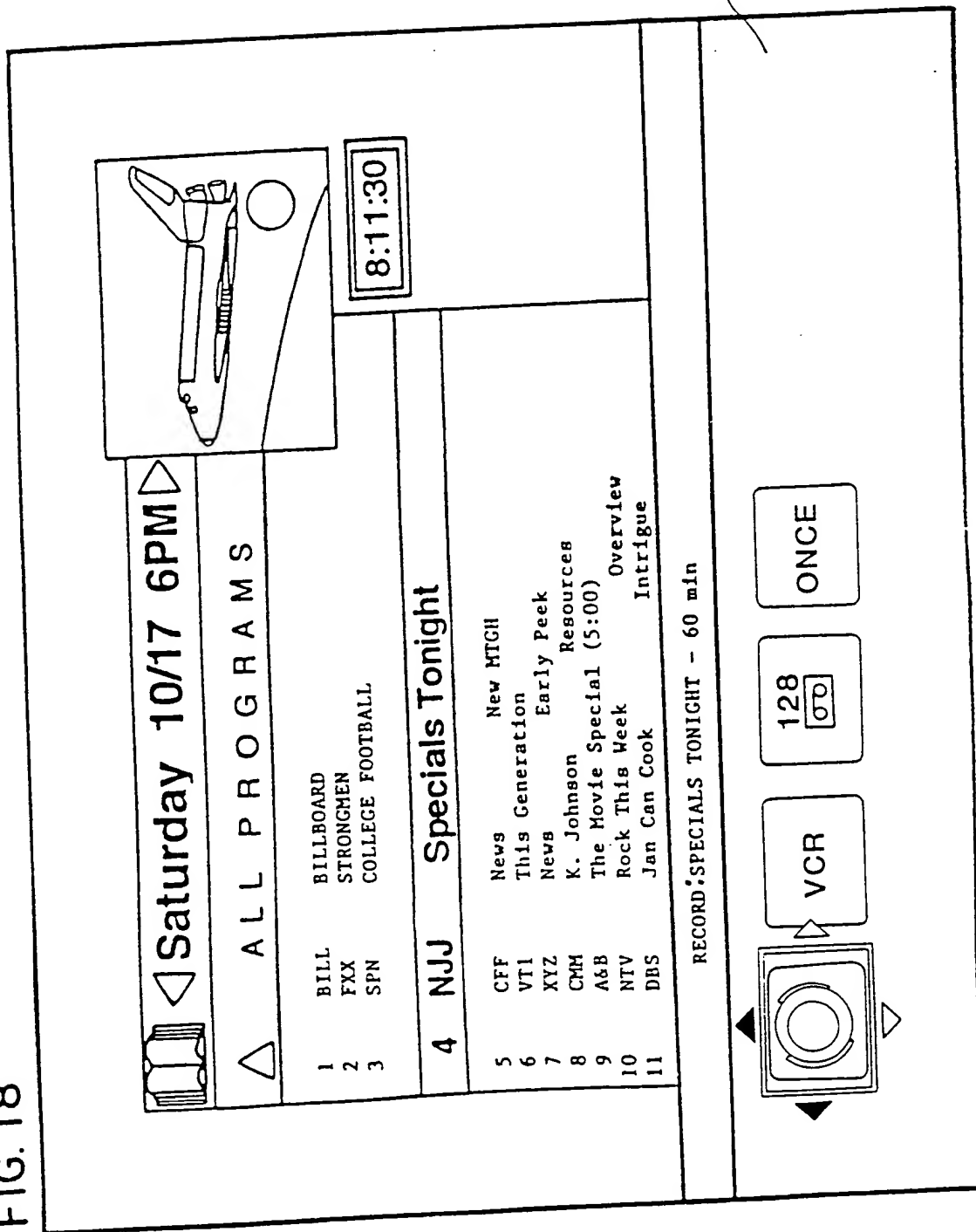
FIG. 17



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FIG. 18



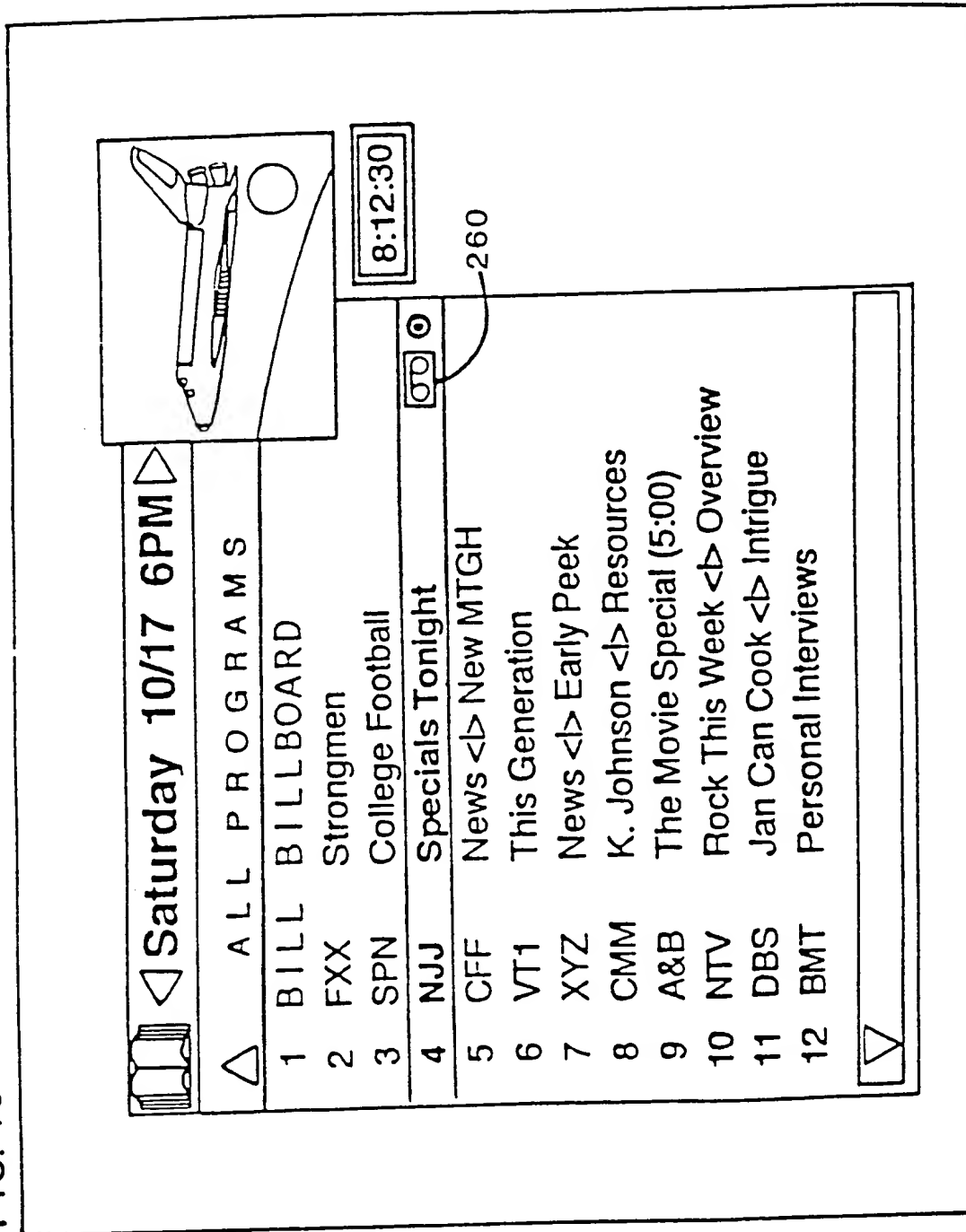
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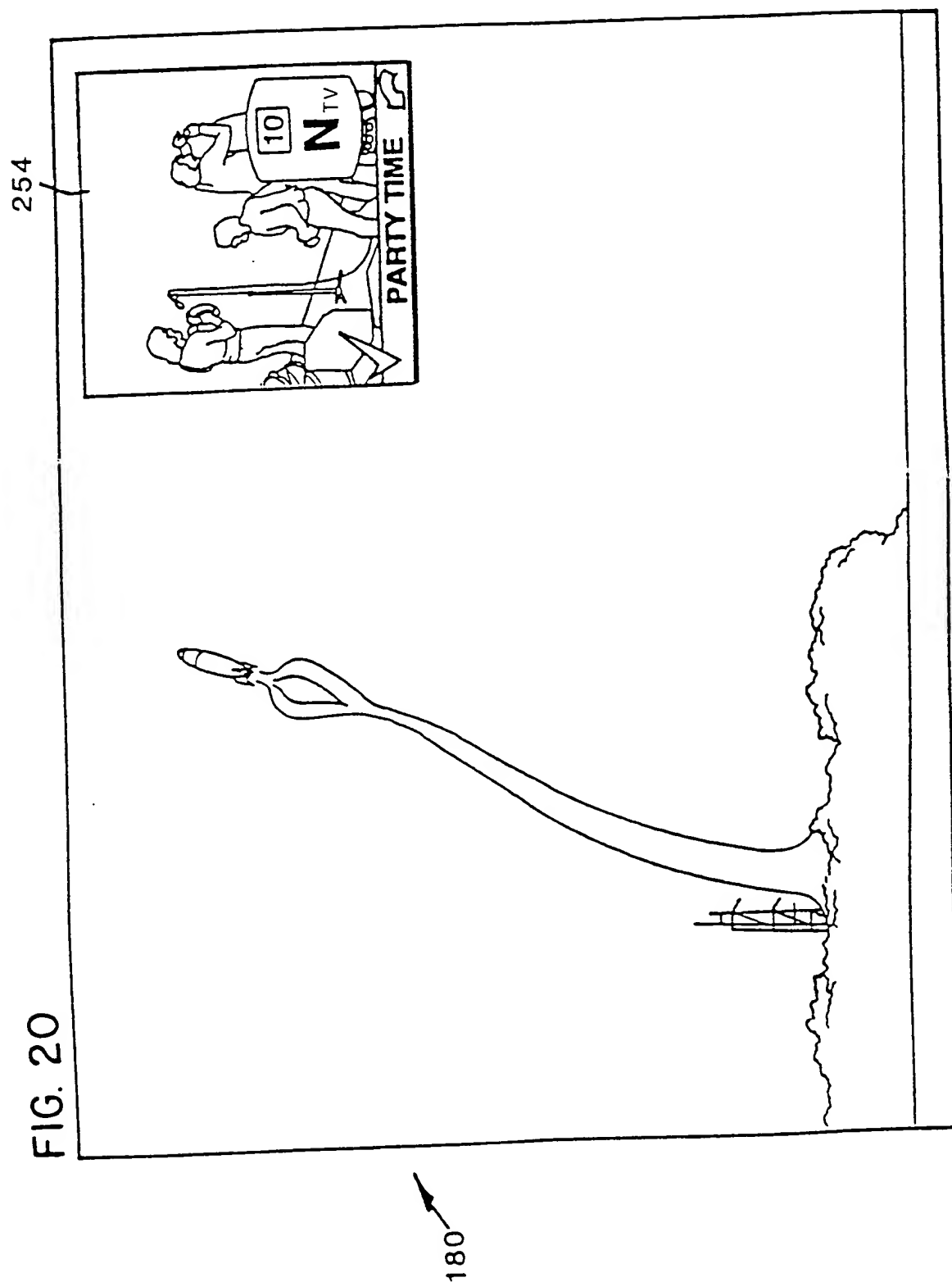
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FIG. 19

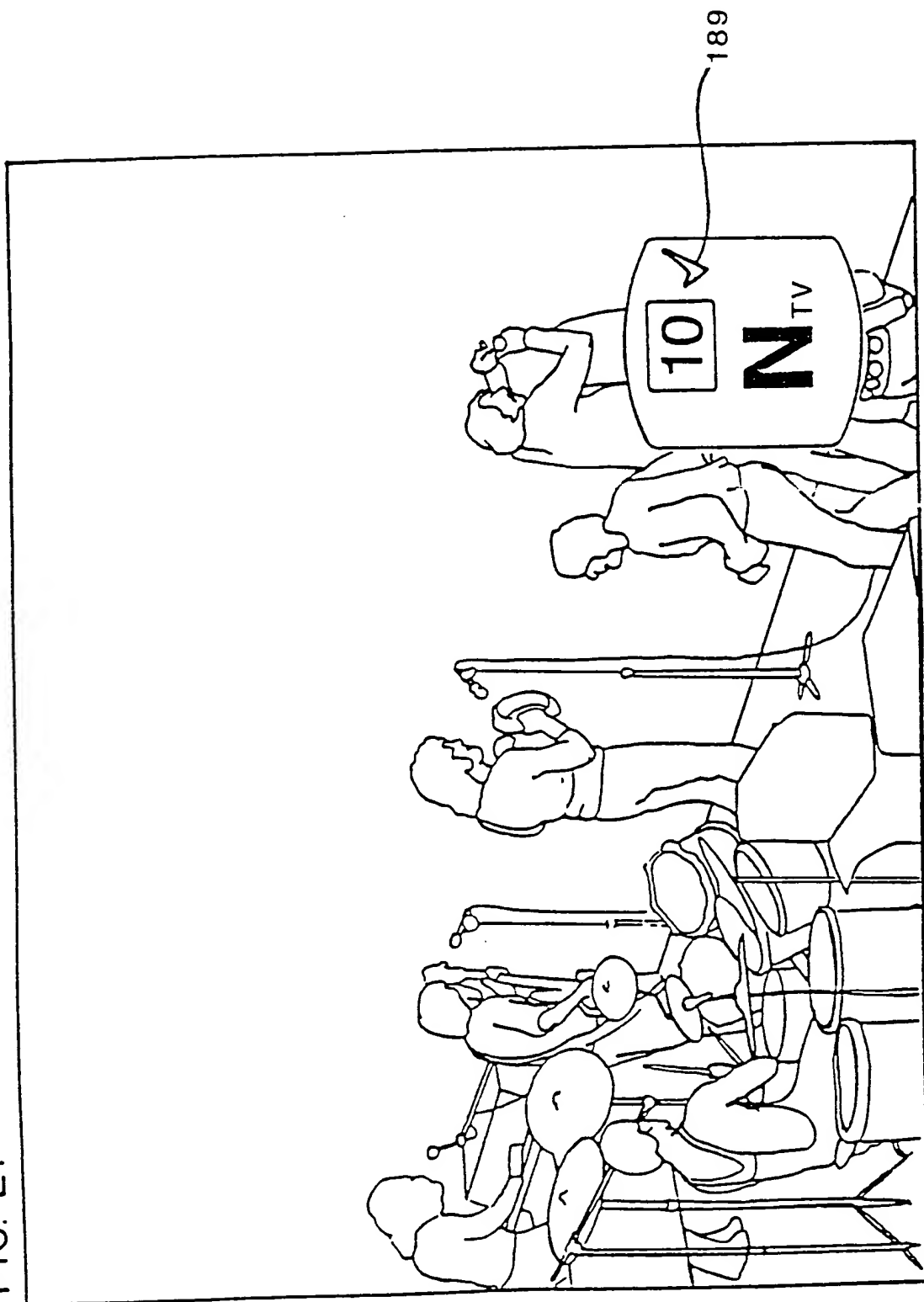


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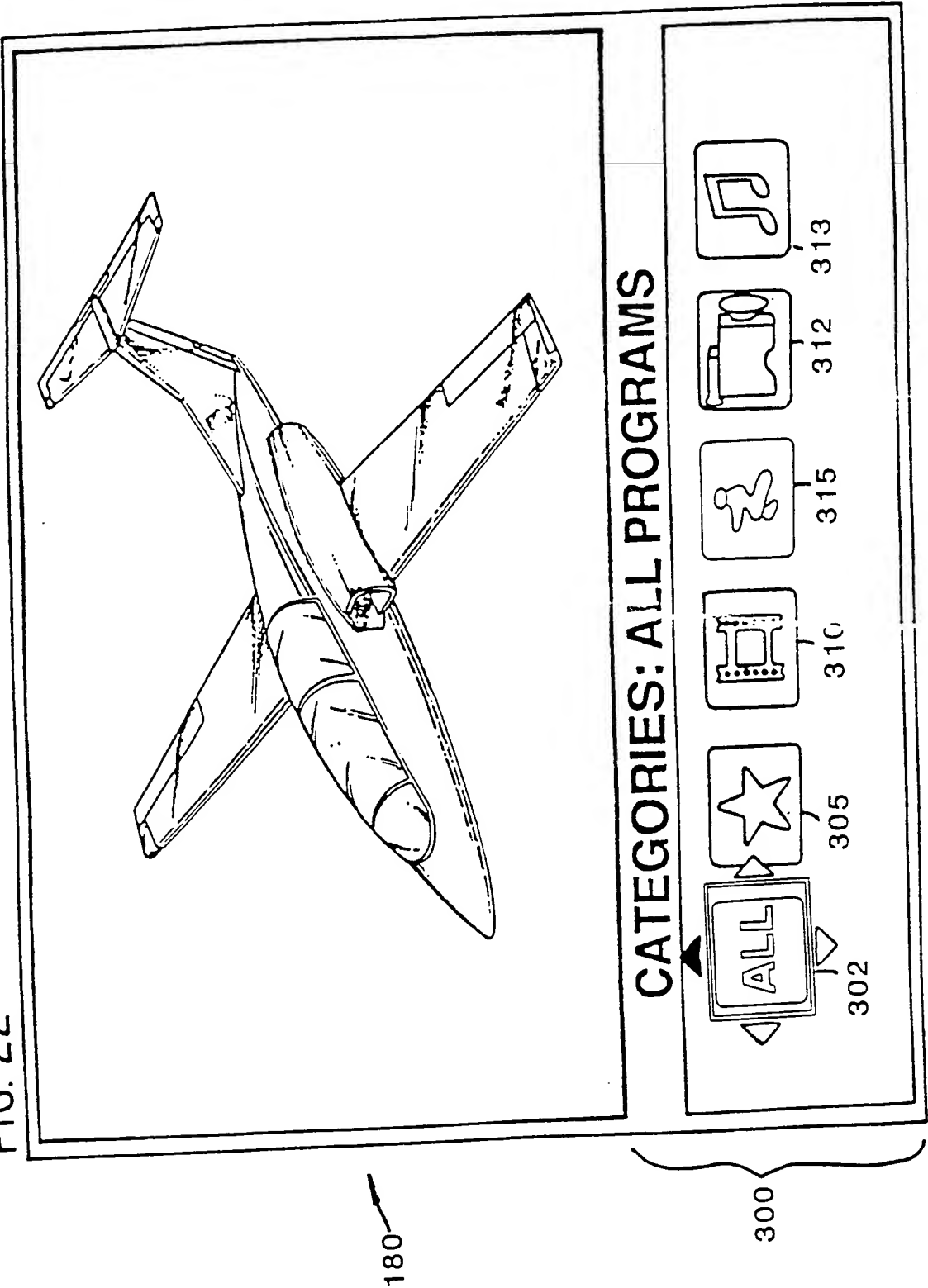
FIG. 21



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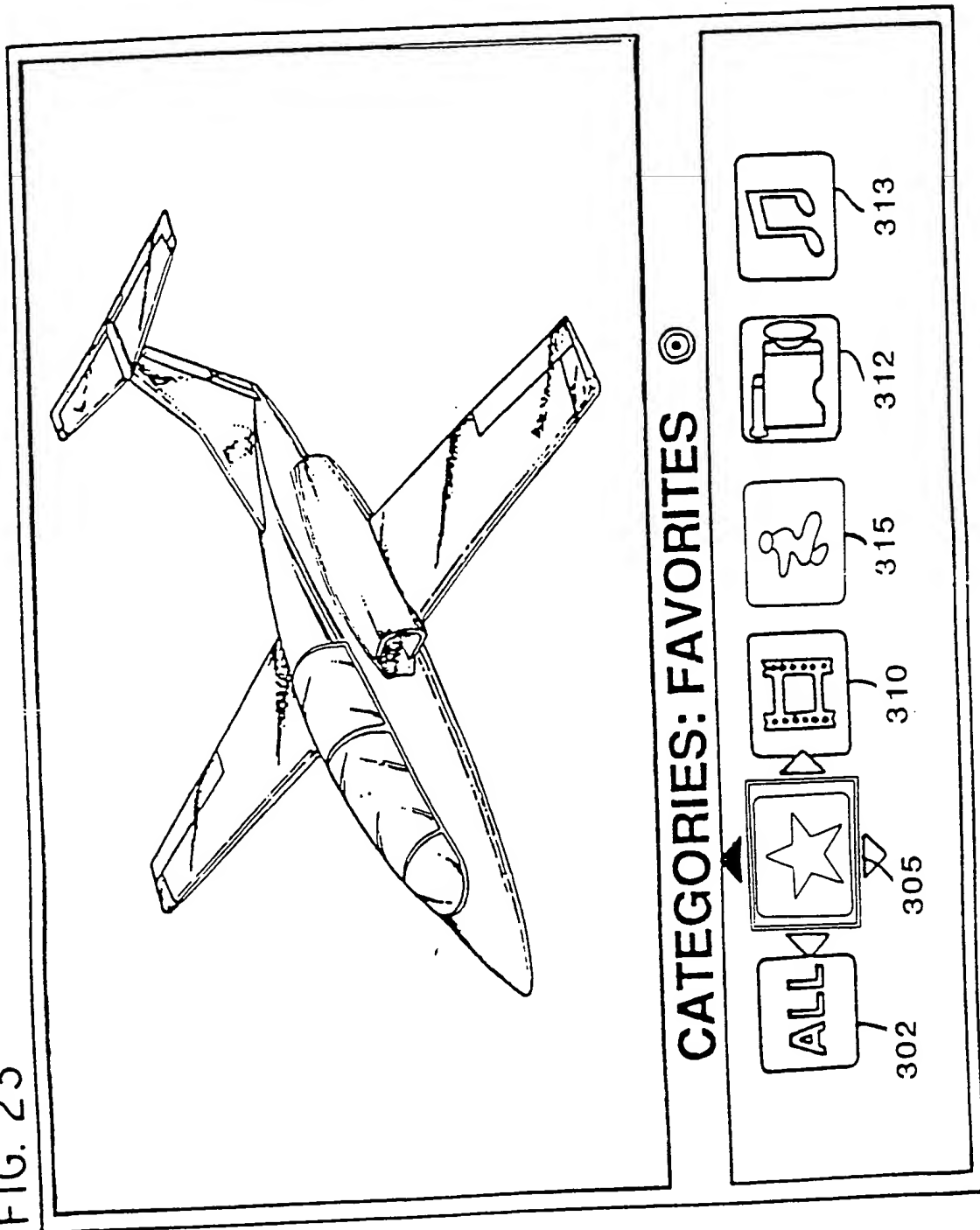
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FIG. 22



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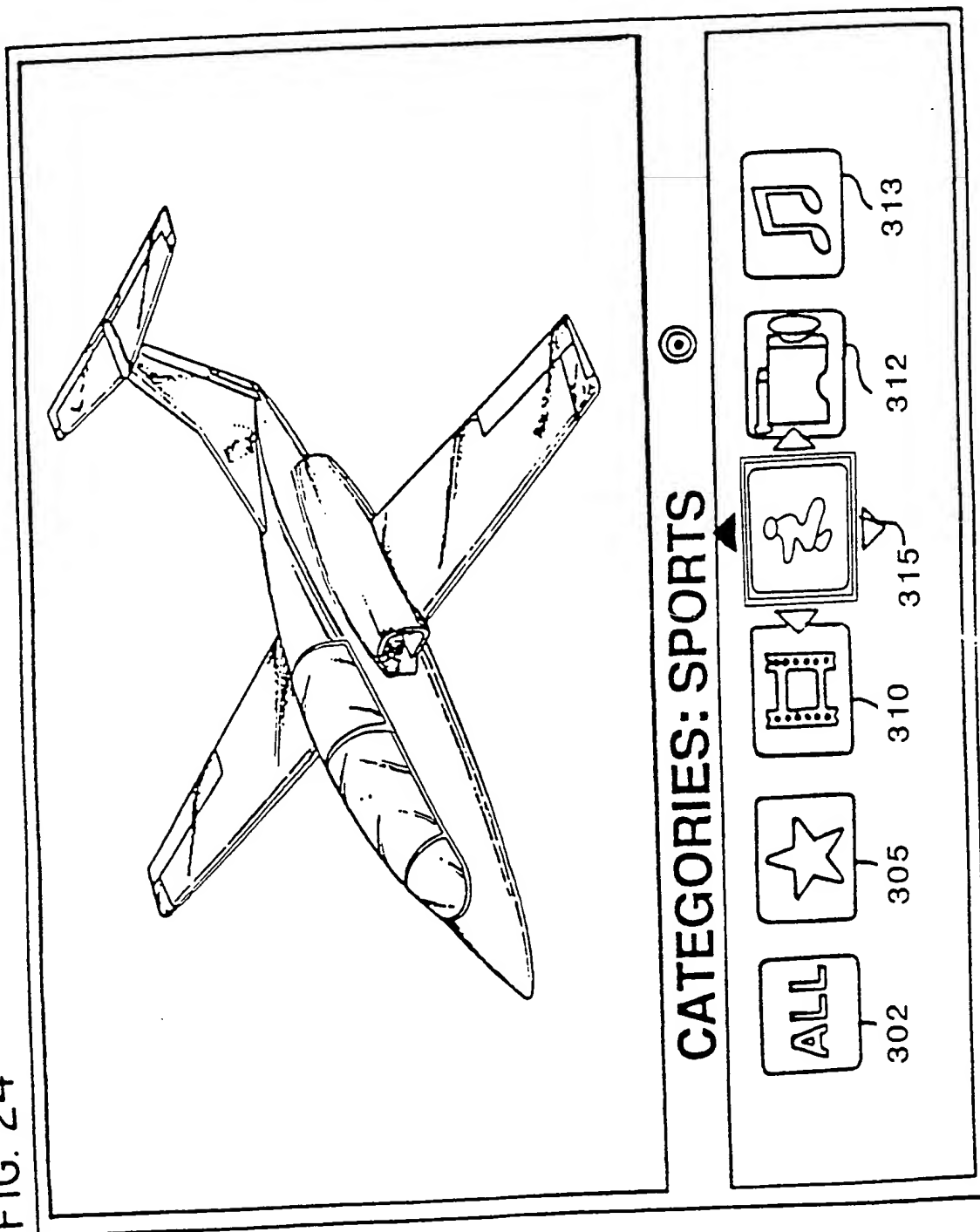
FIG. 23



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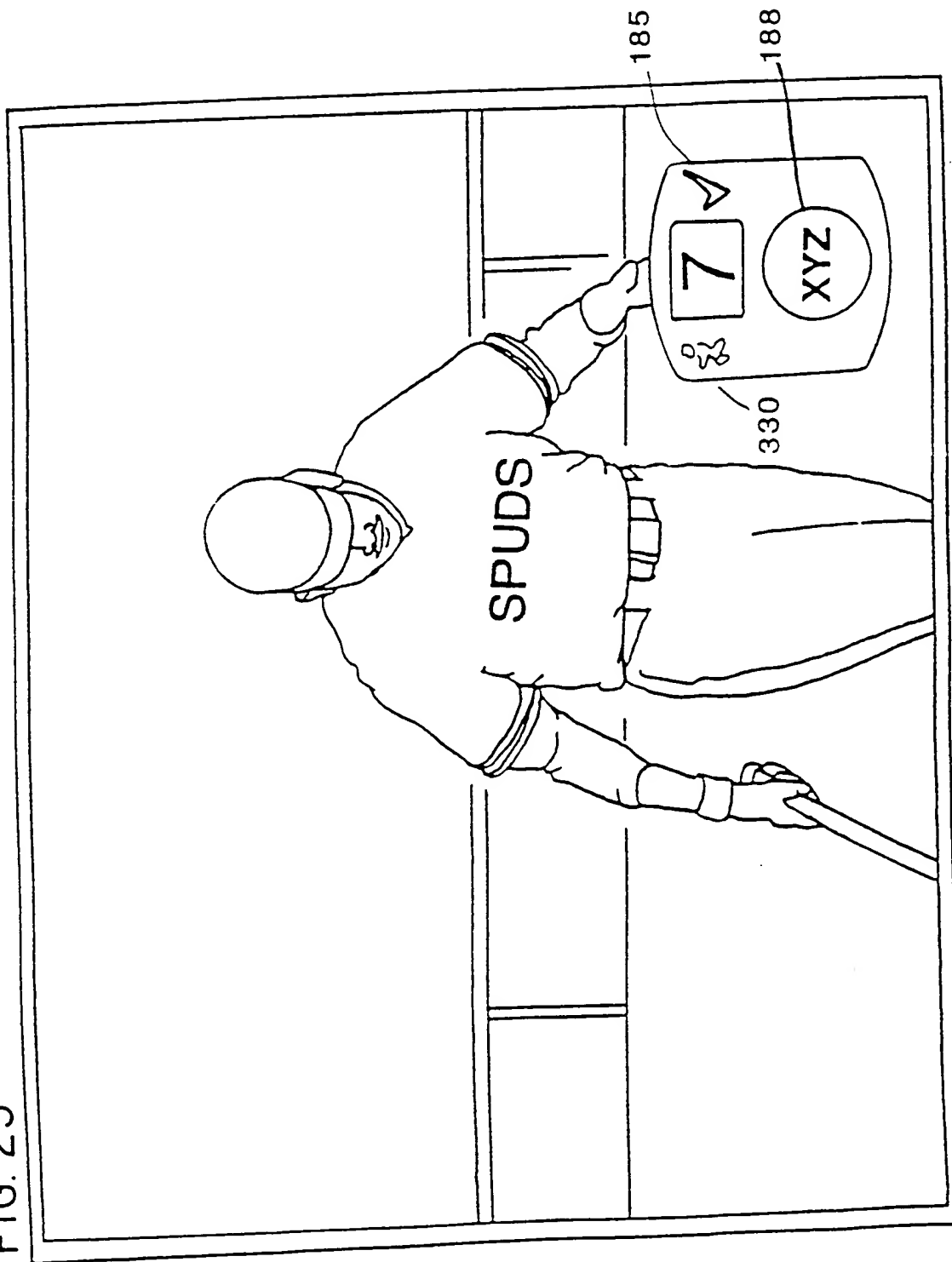
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FIG. 24



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FIG. 25



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FIG. 26

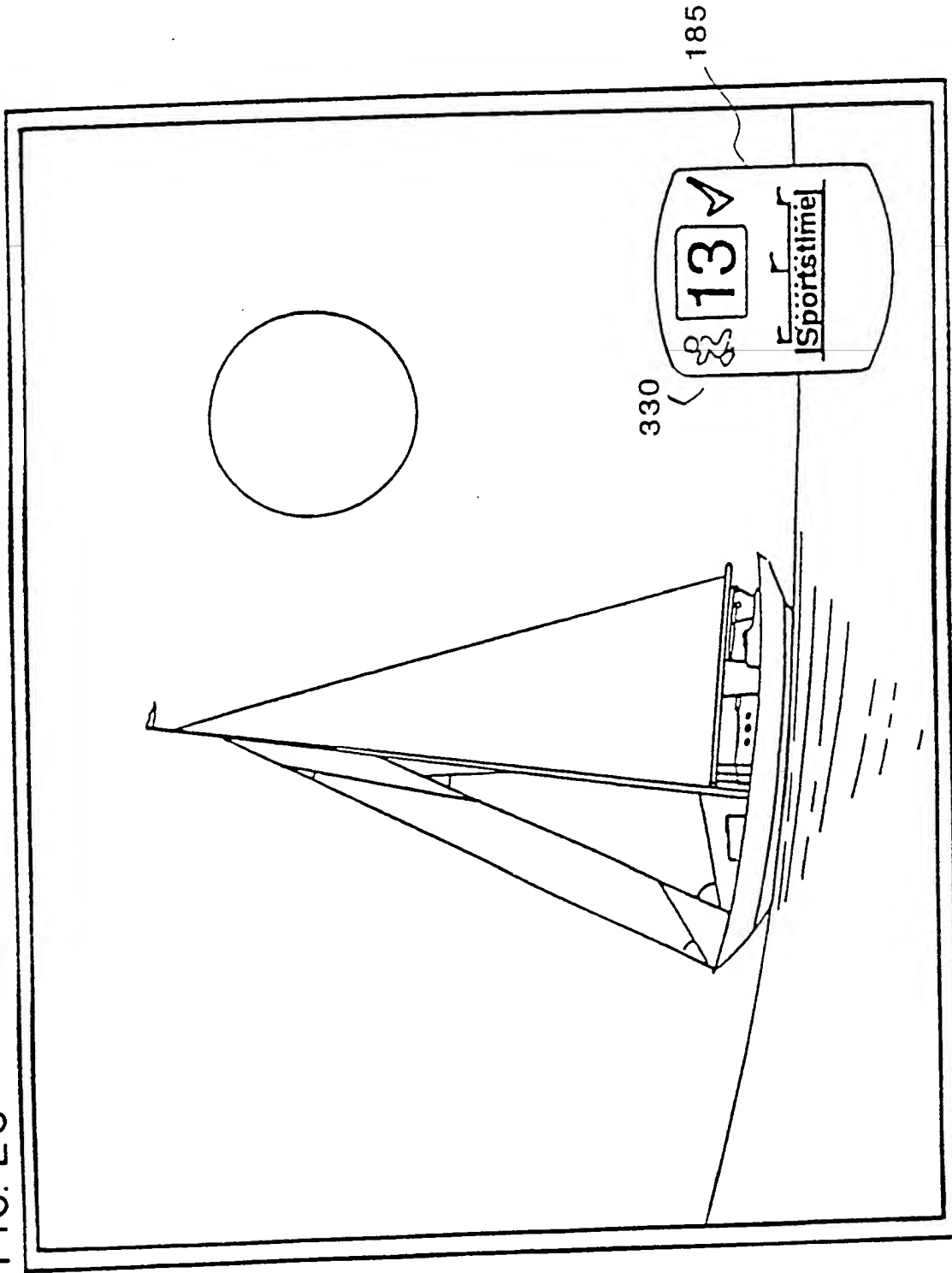


FIG. 27

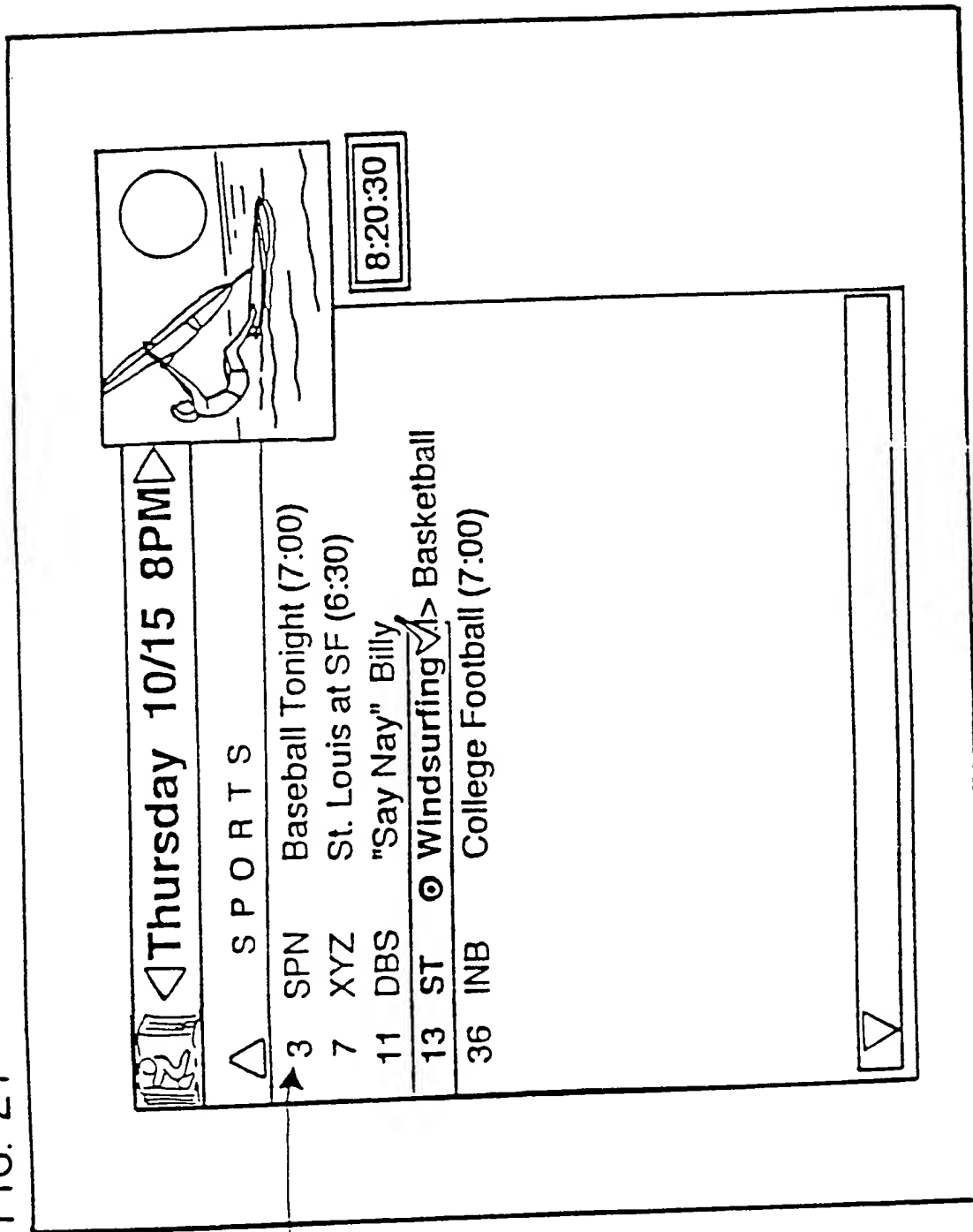


FIG. 28

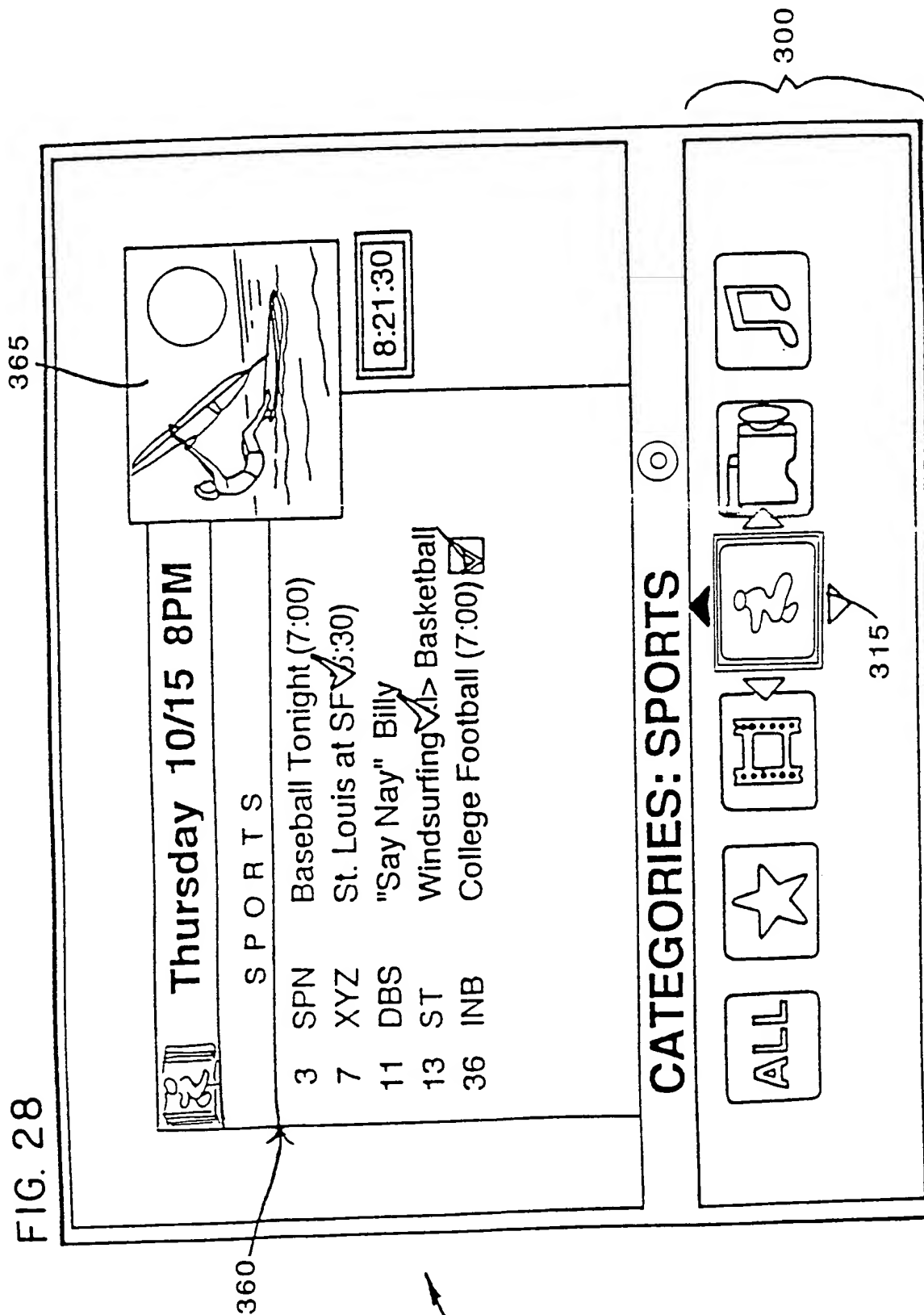
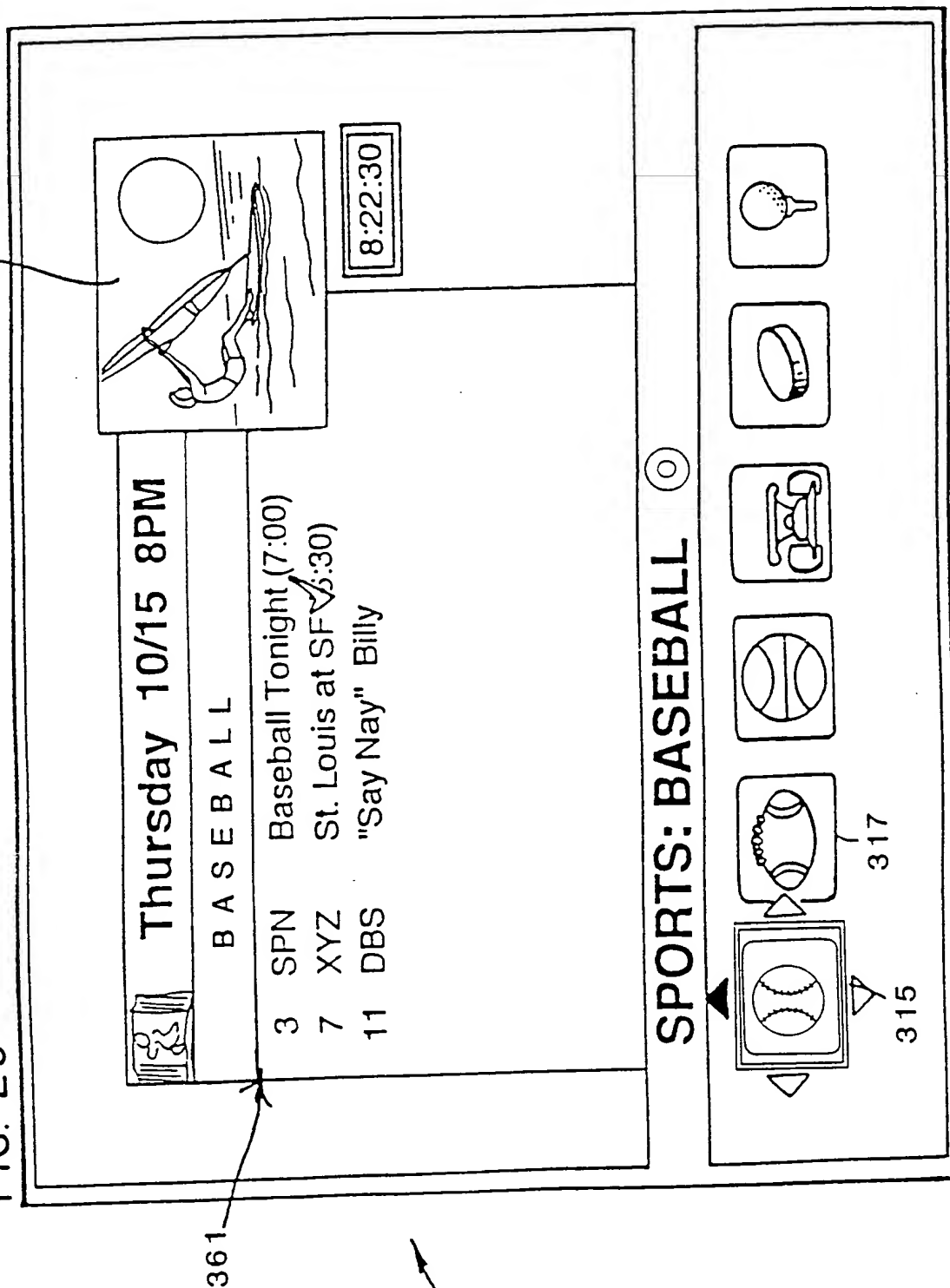
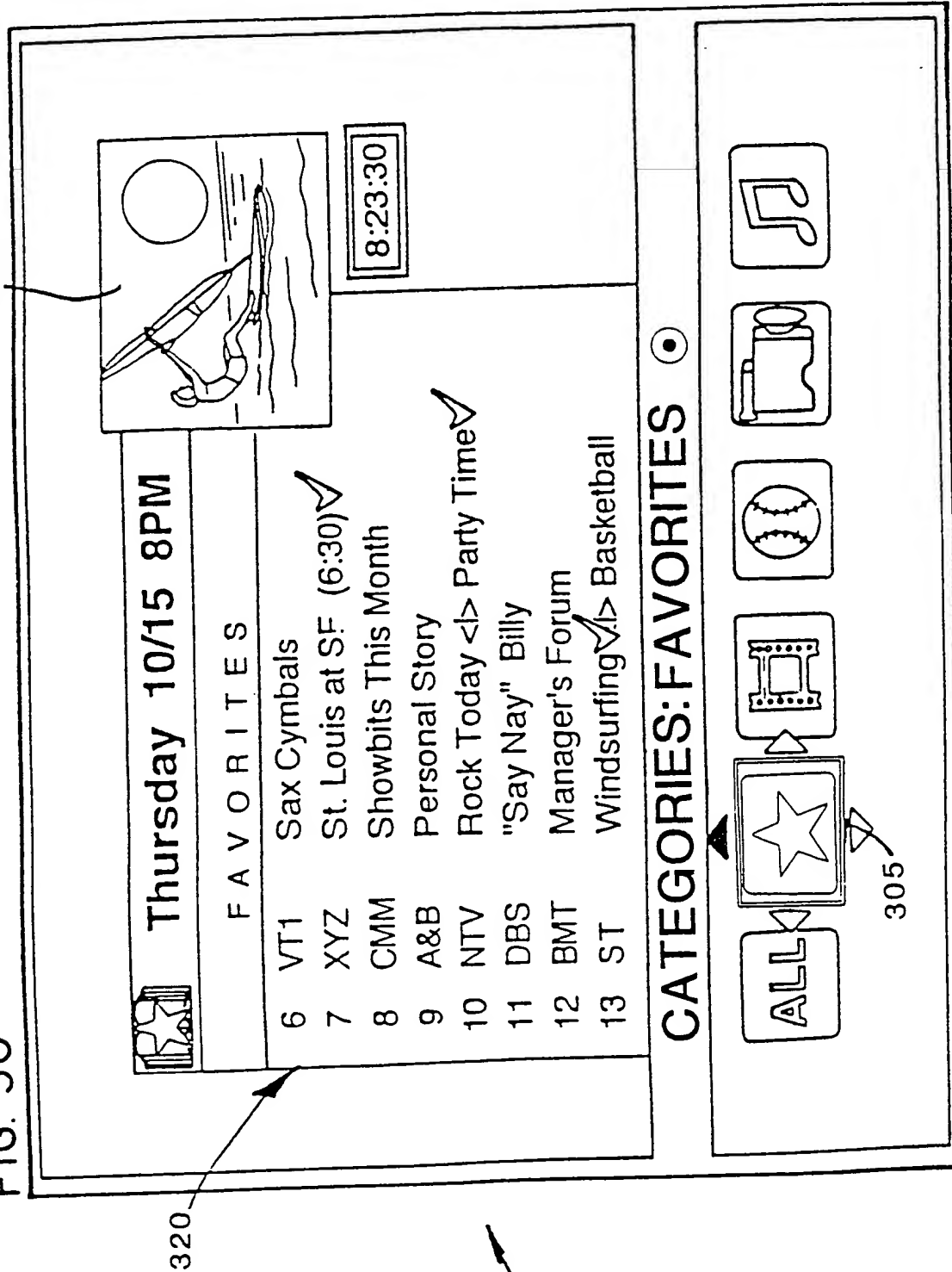


FIG. 29



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FIG. 30



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FIG. 31

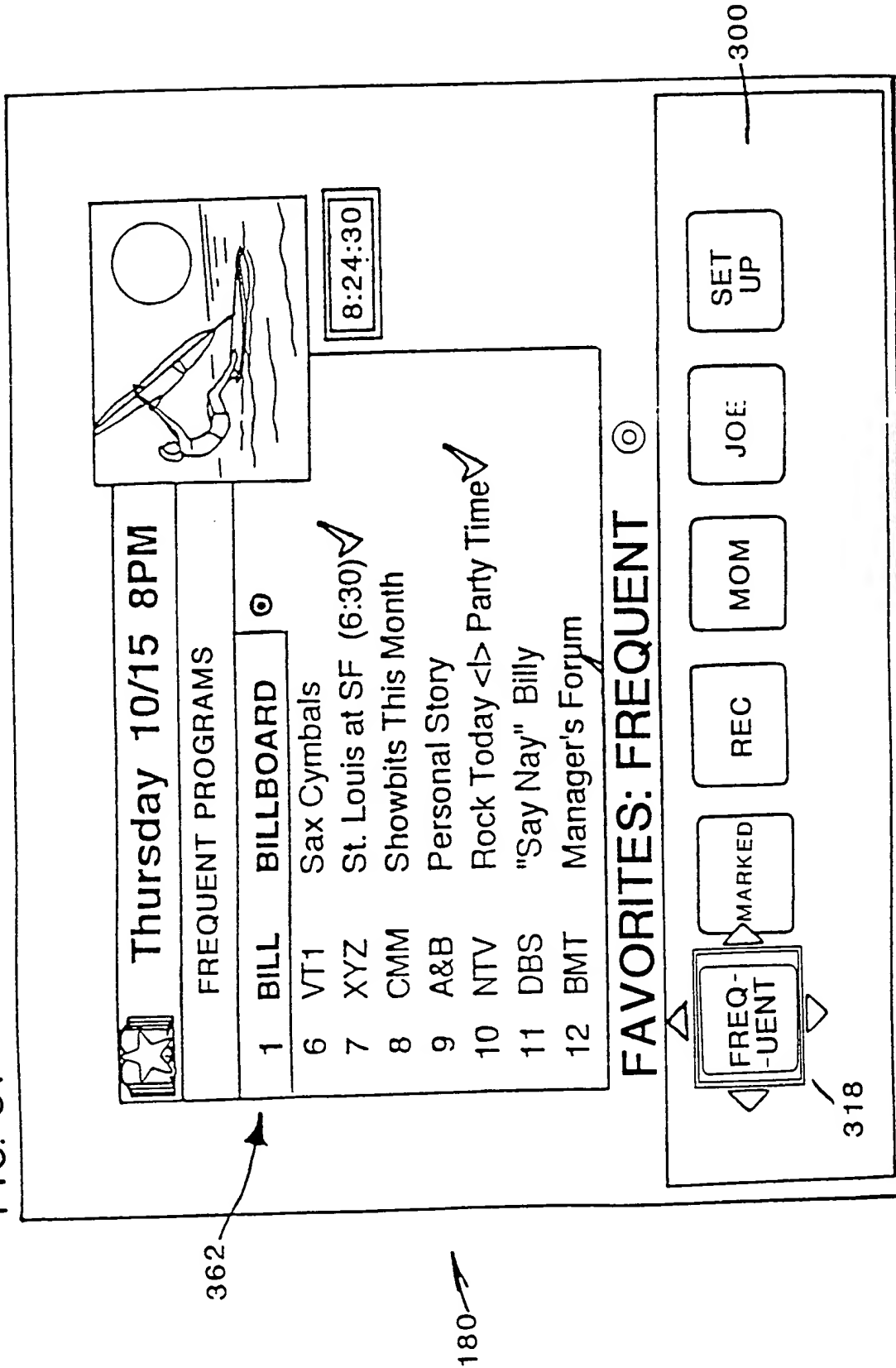
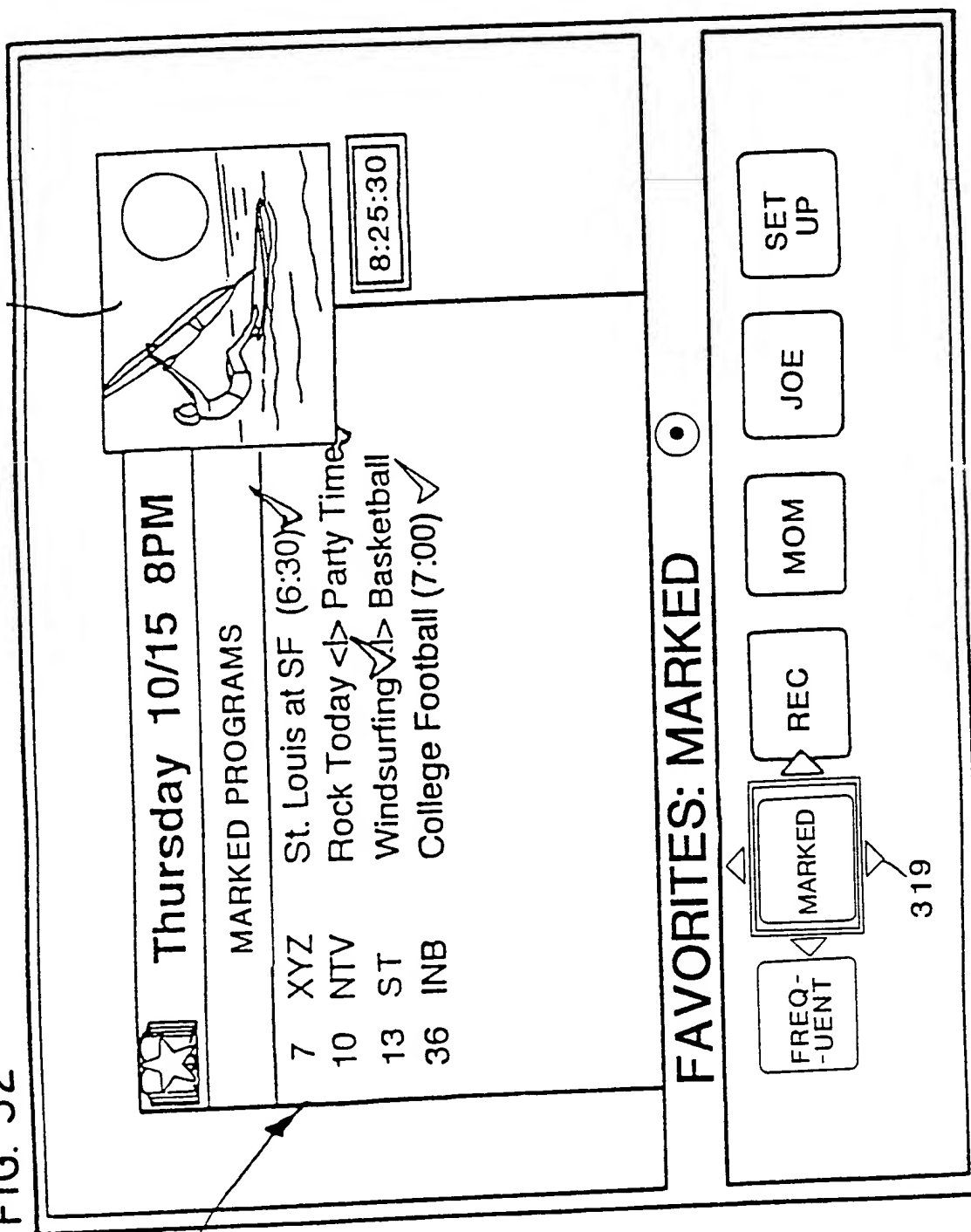
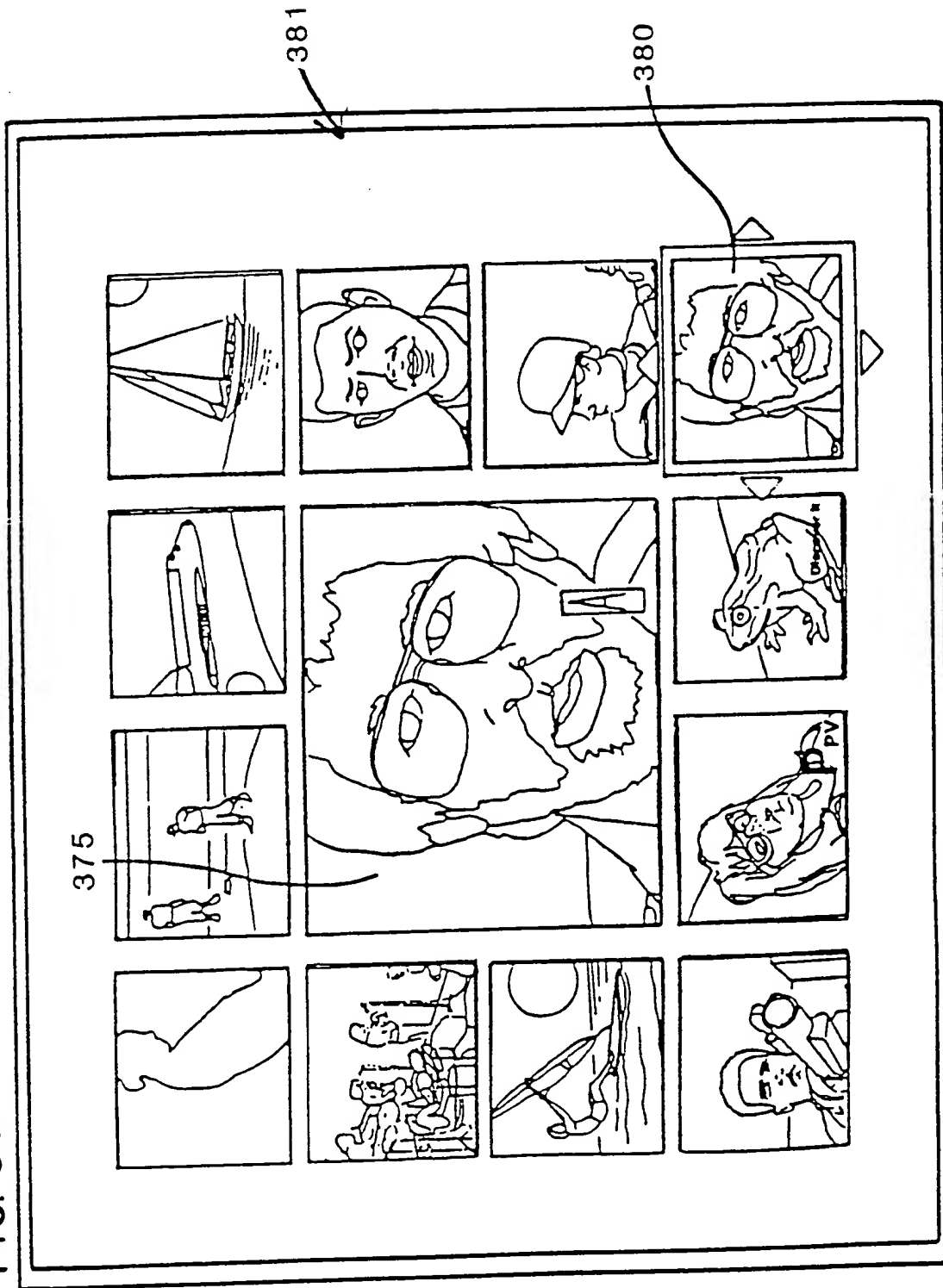


FIG. 32



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FIG. 33

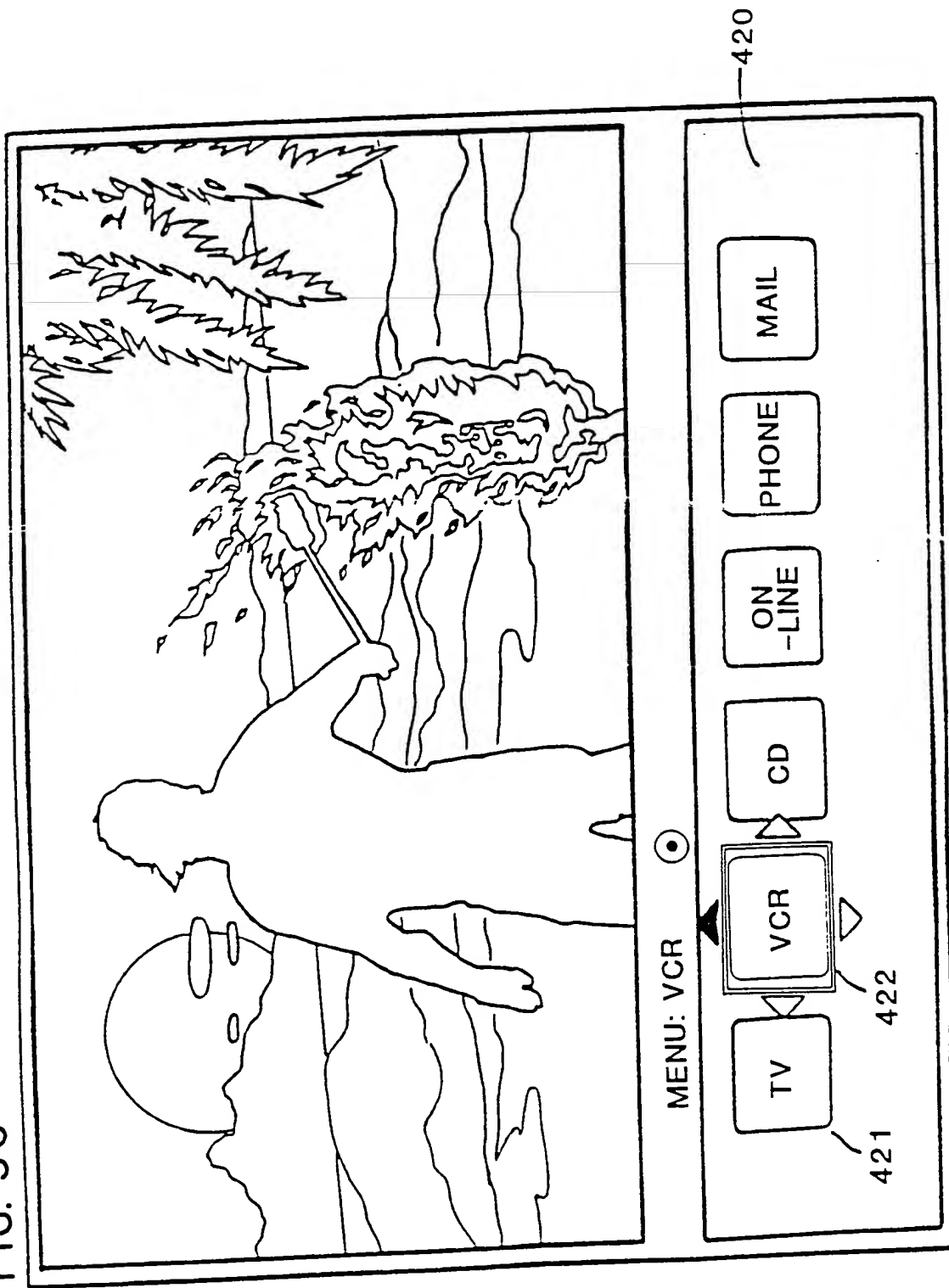


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FIG. 36



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FIG. 37

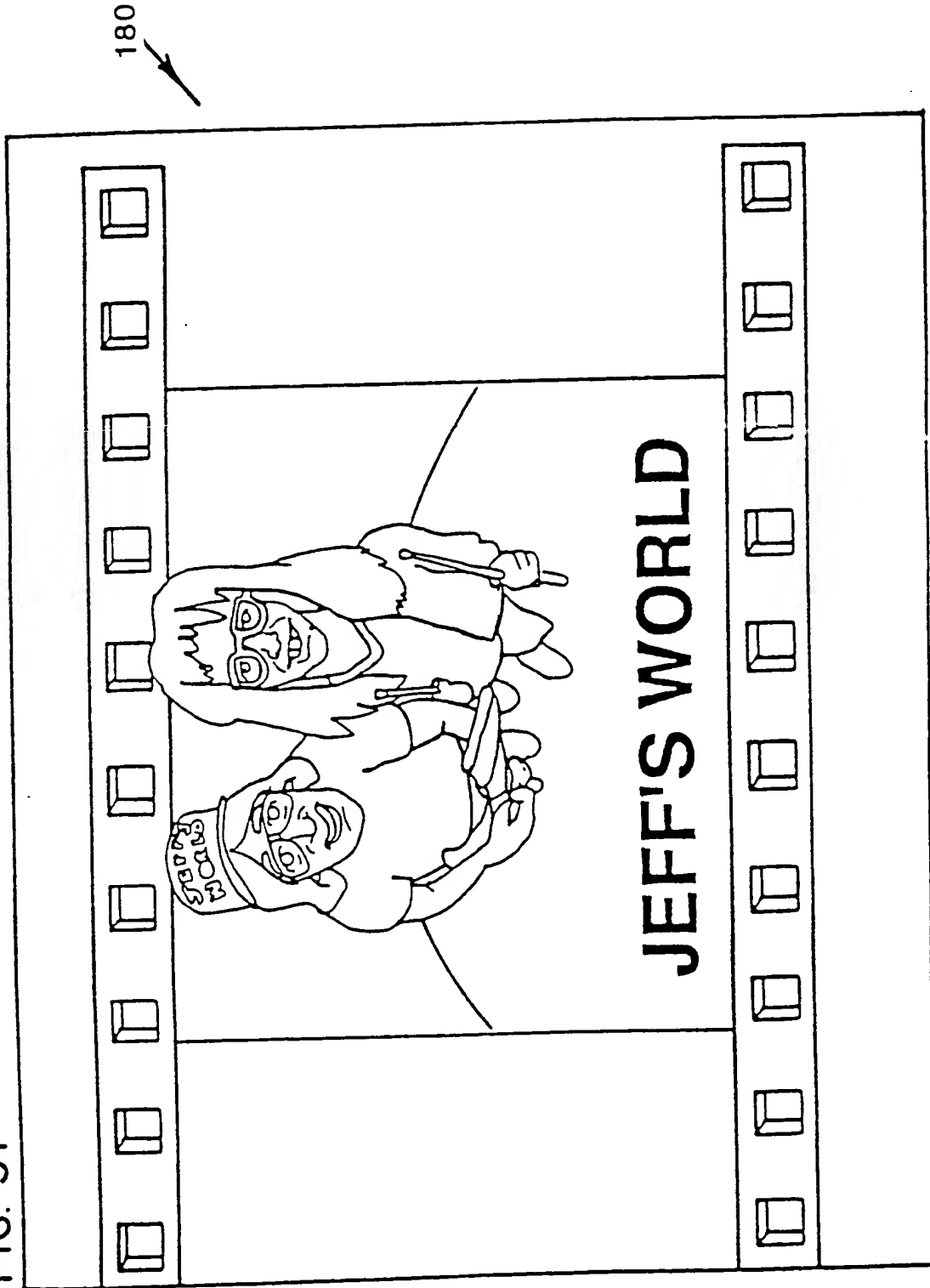


FIG. 38

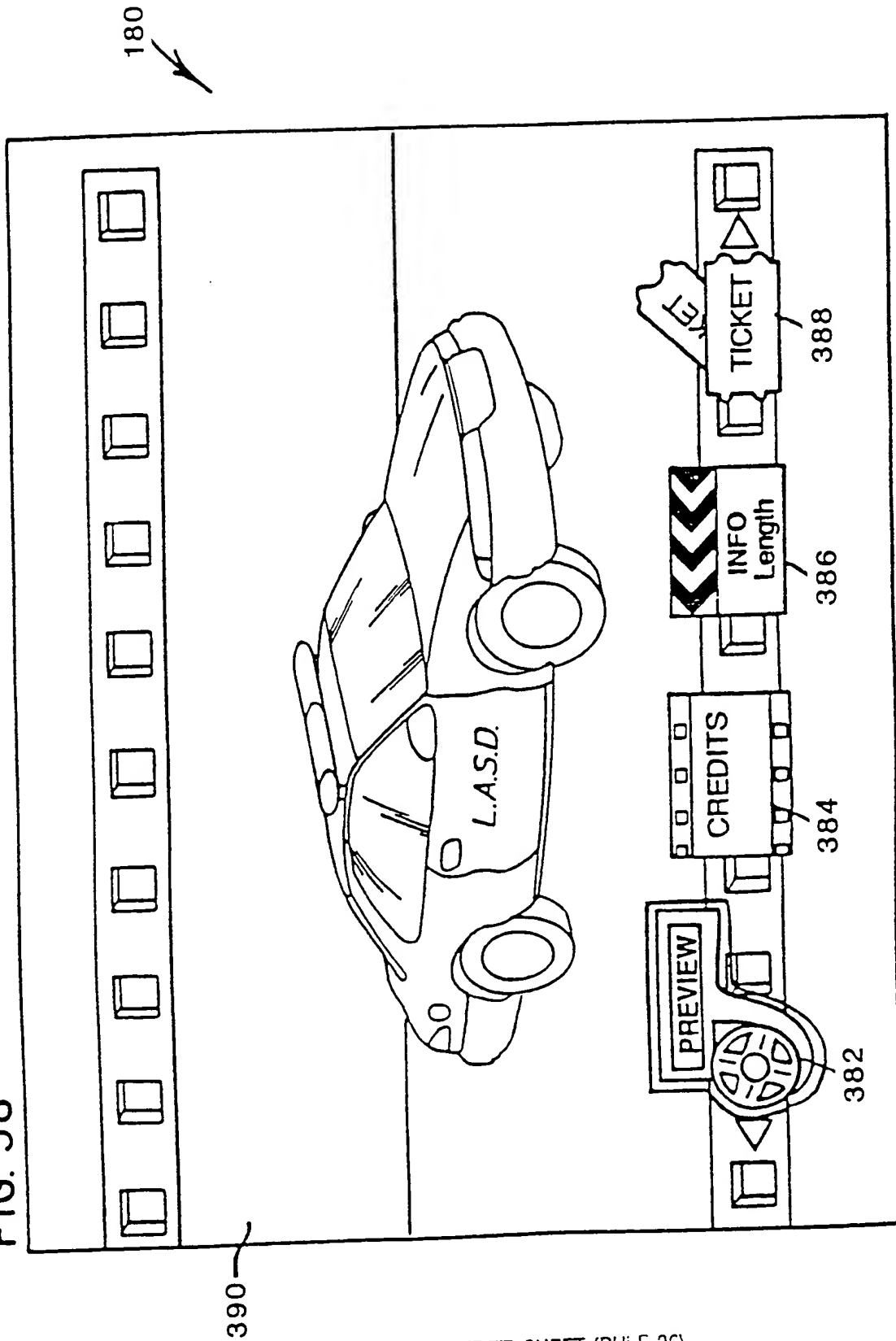


FIG. 39

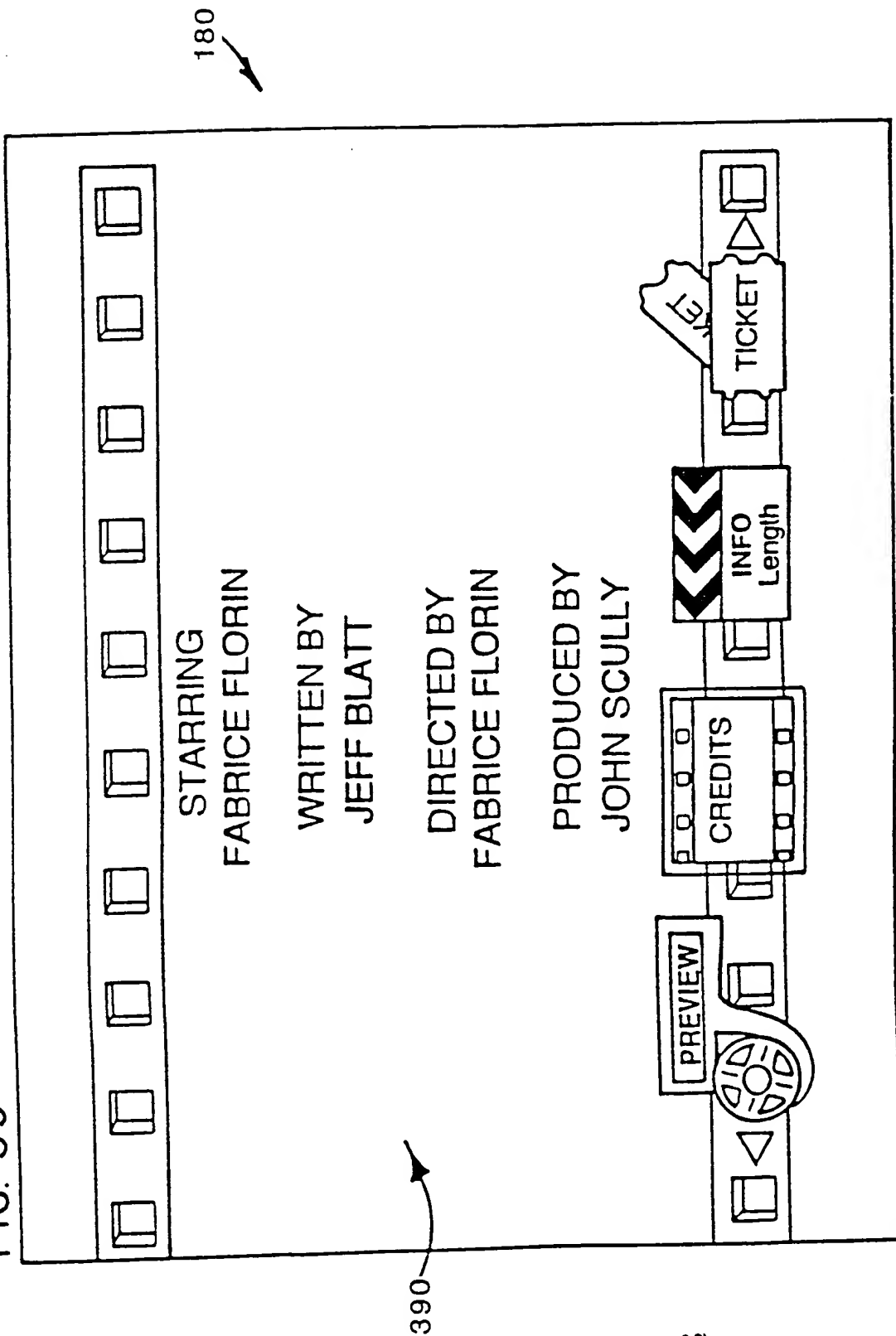
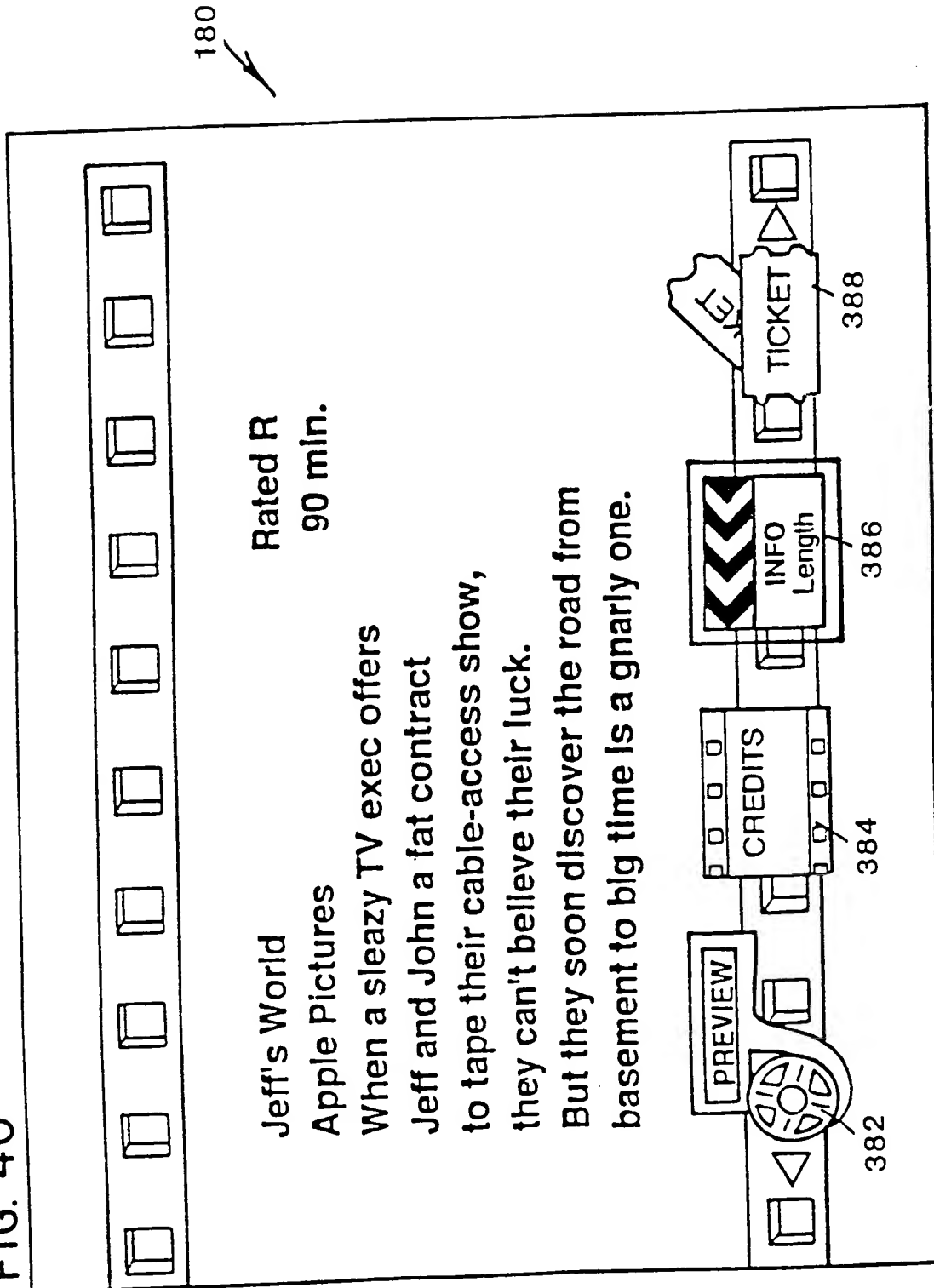
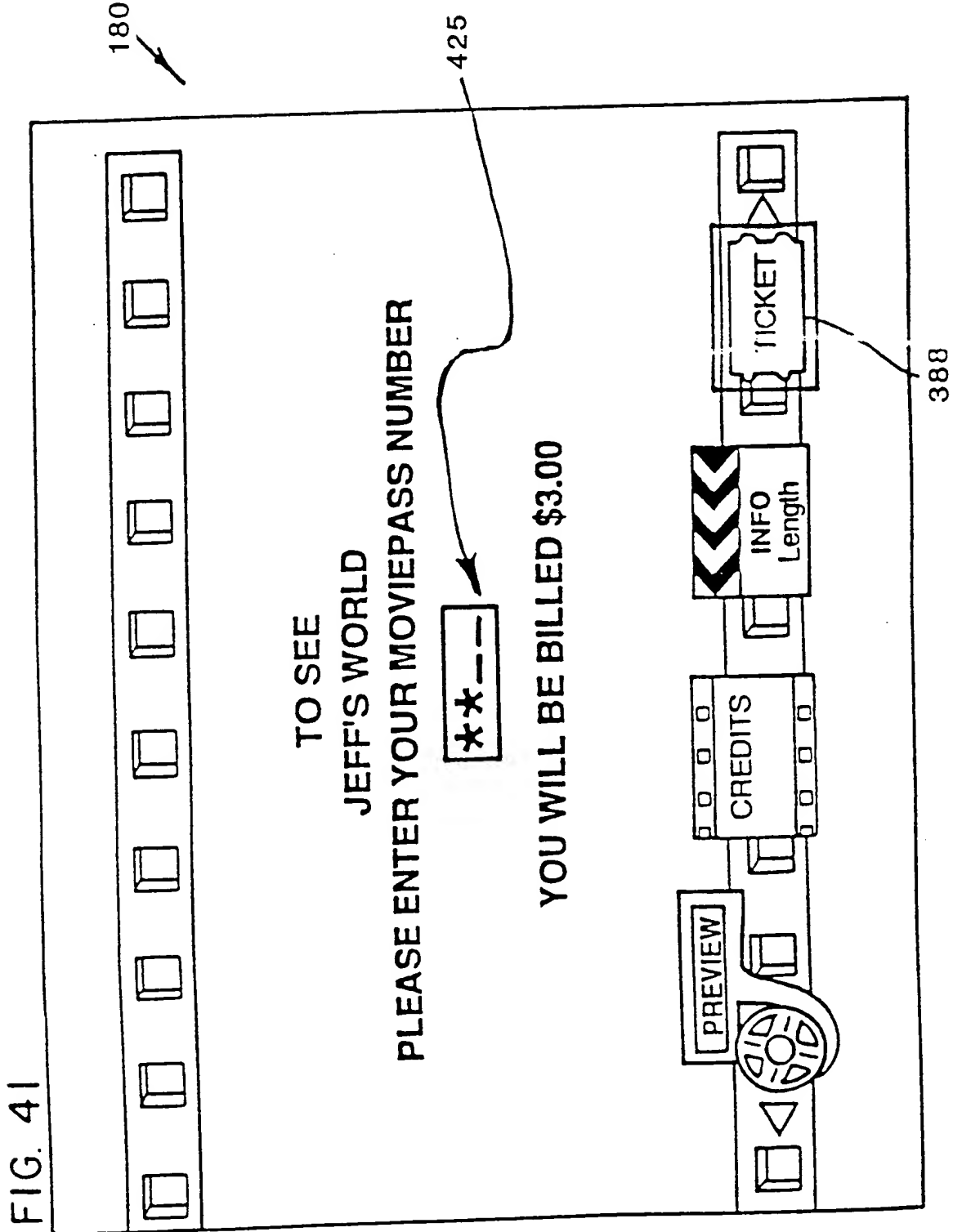


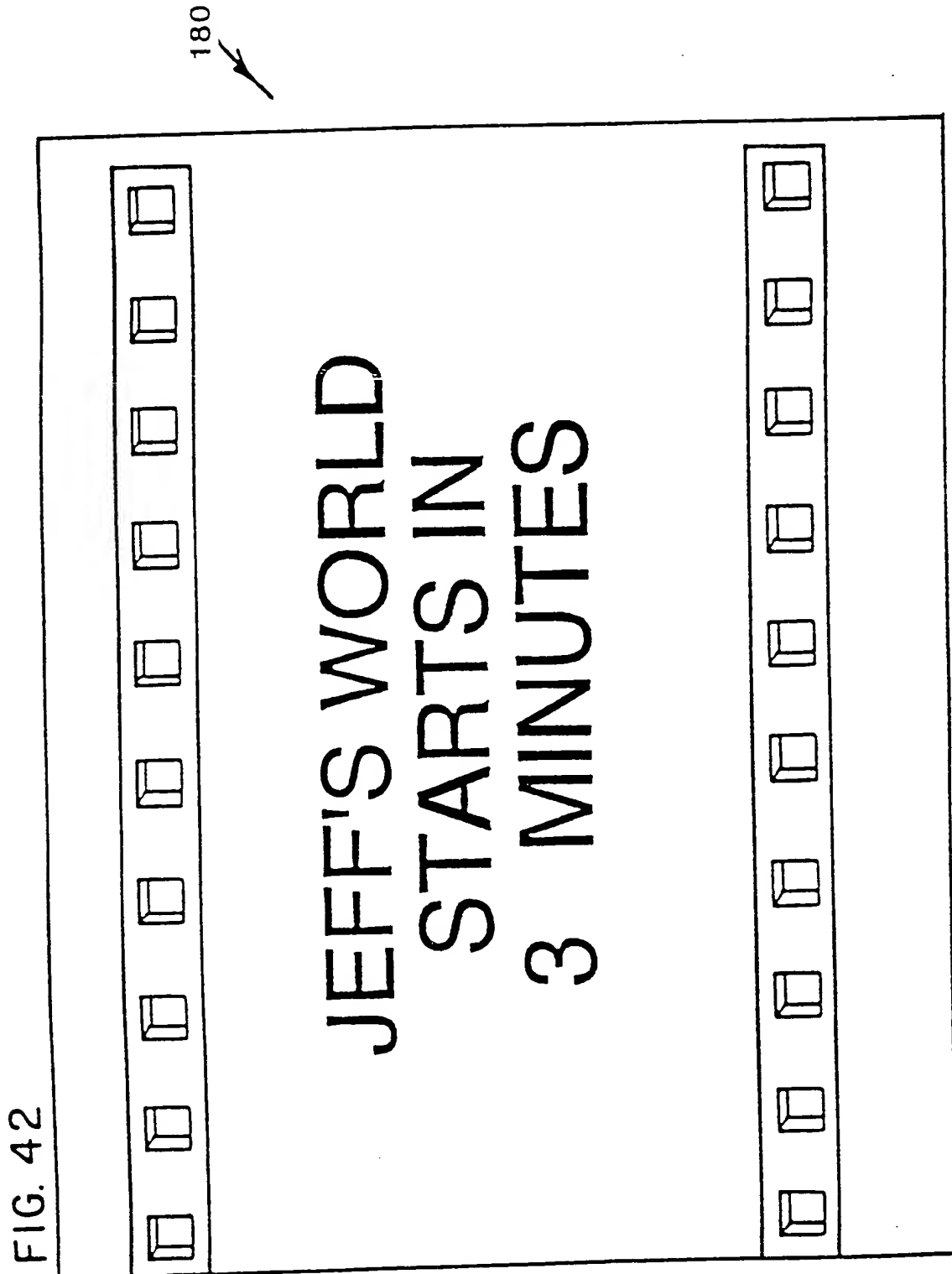
FIG. 40



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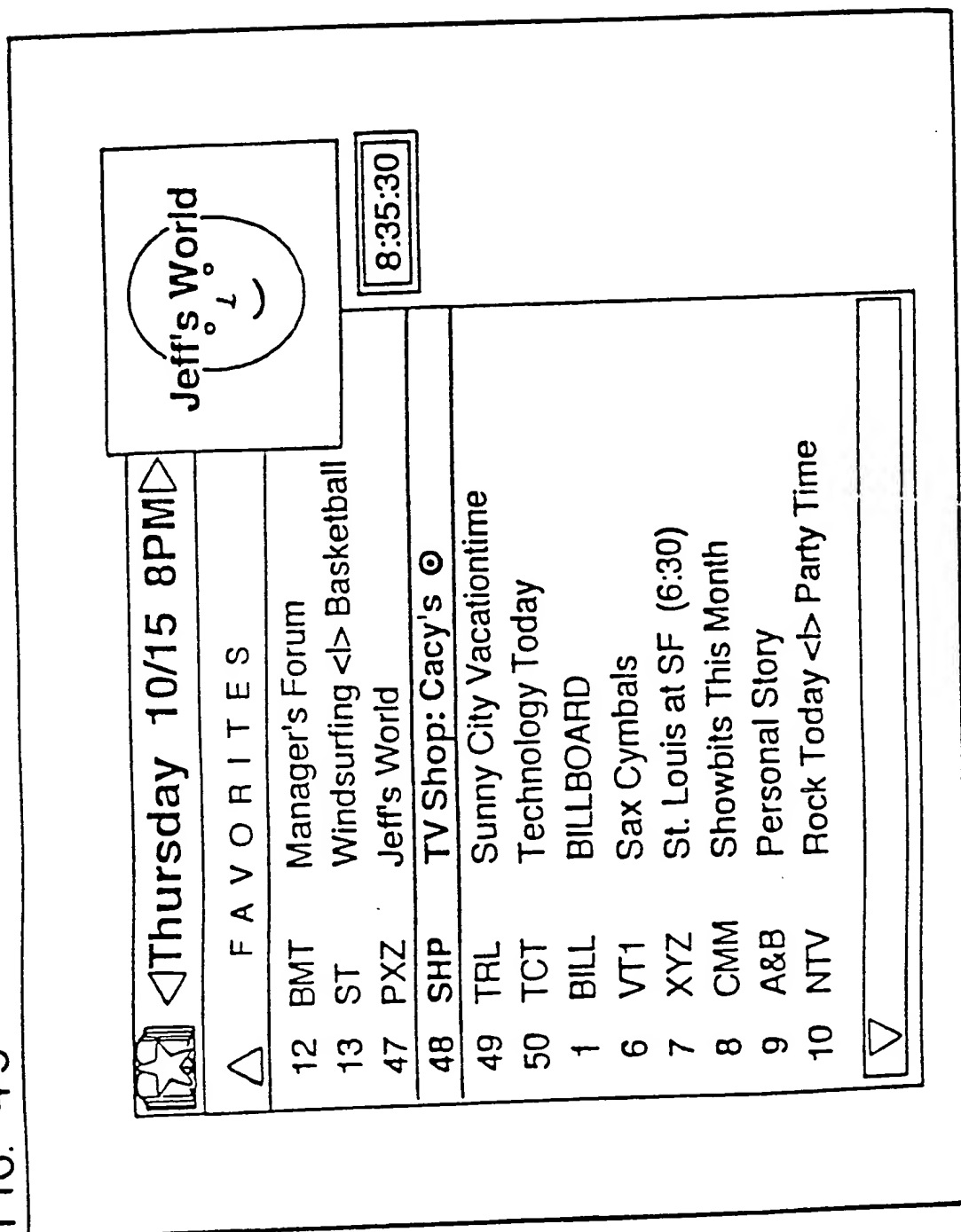


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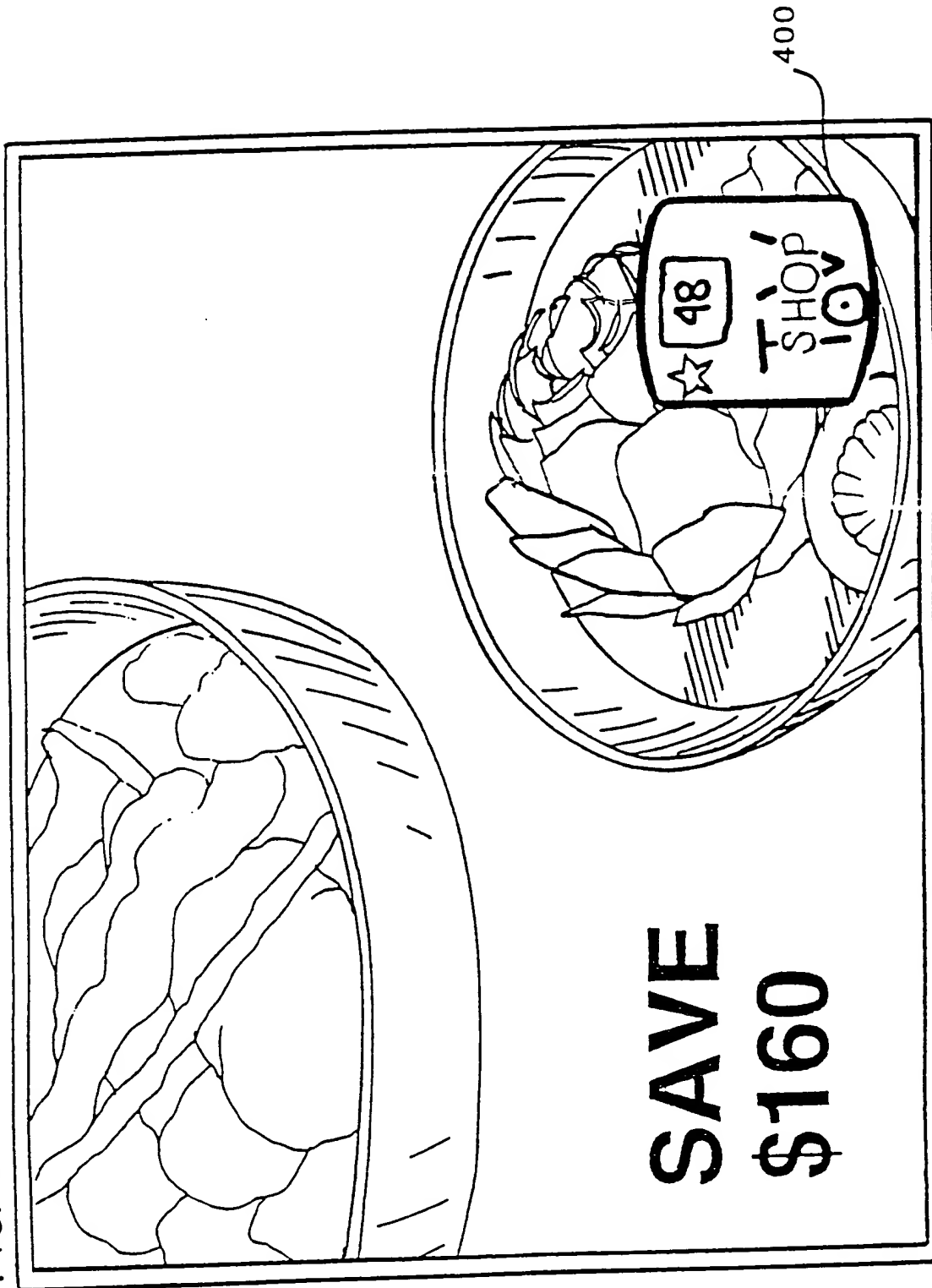
FIG. 43



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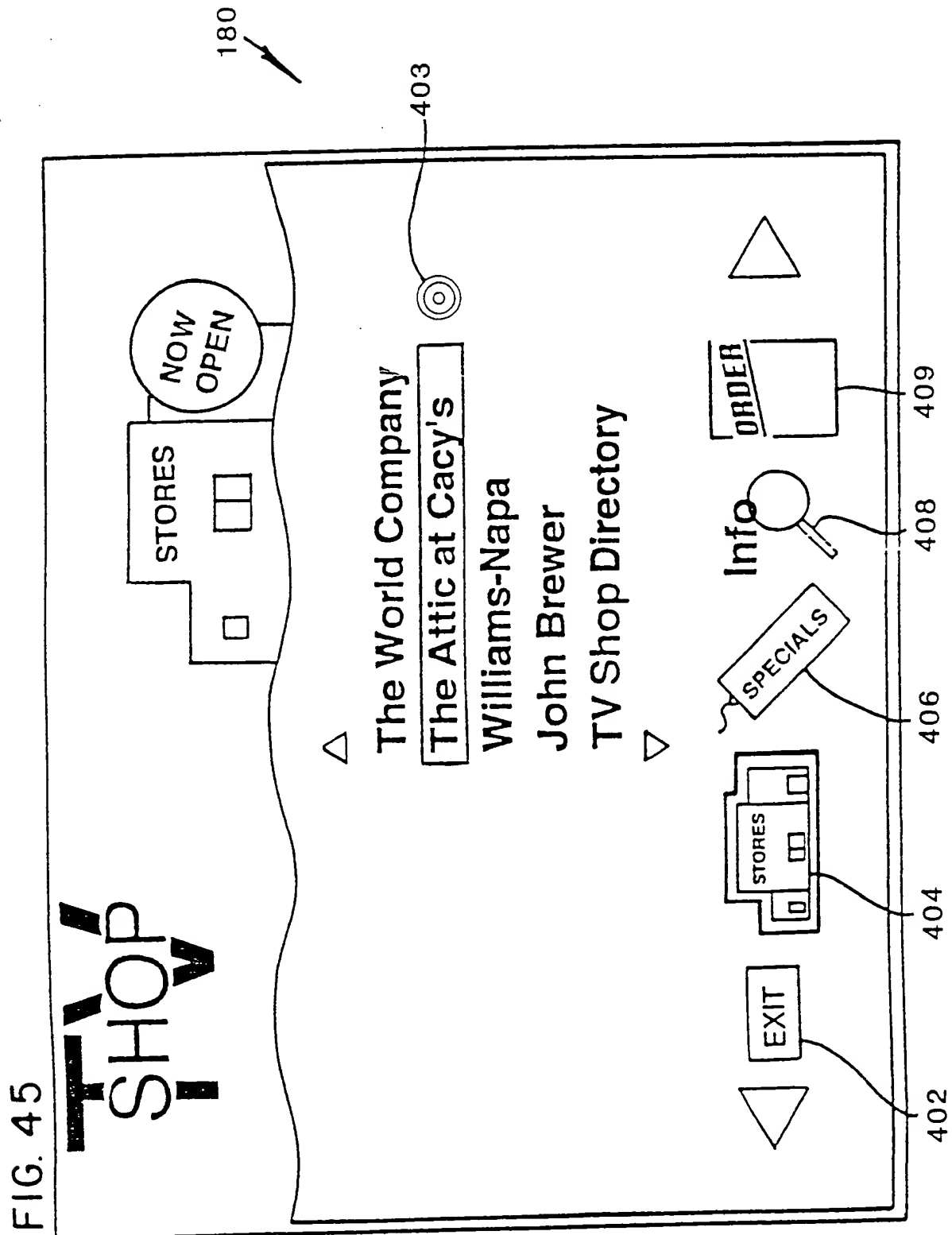
FIG. 44



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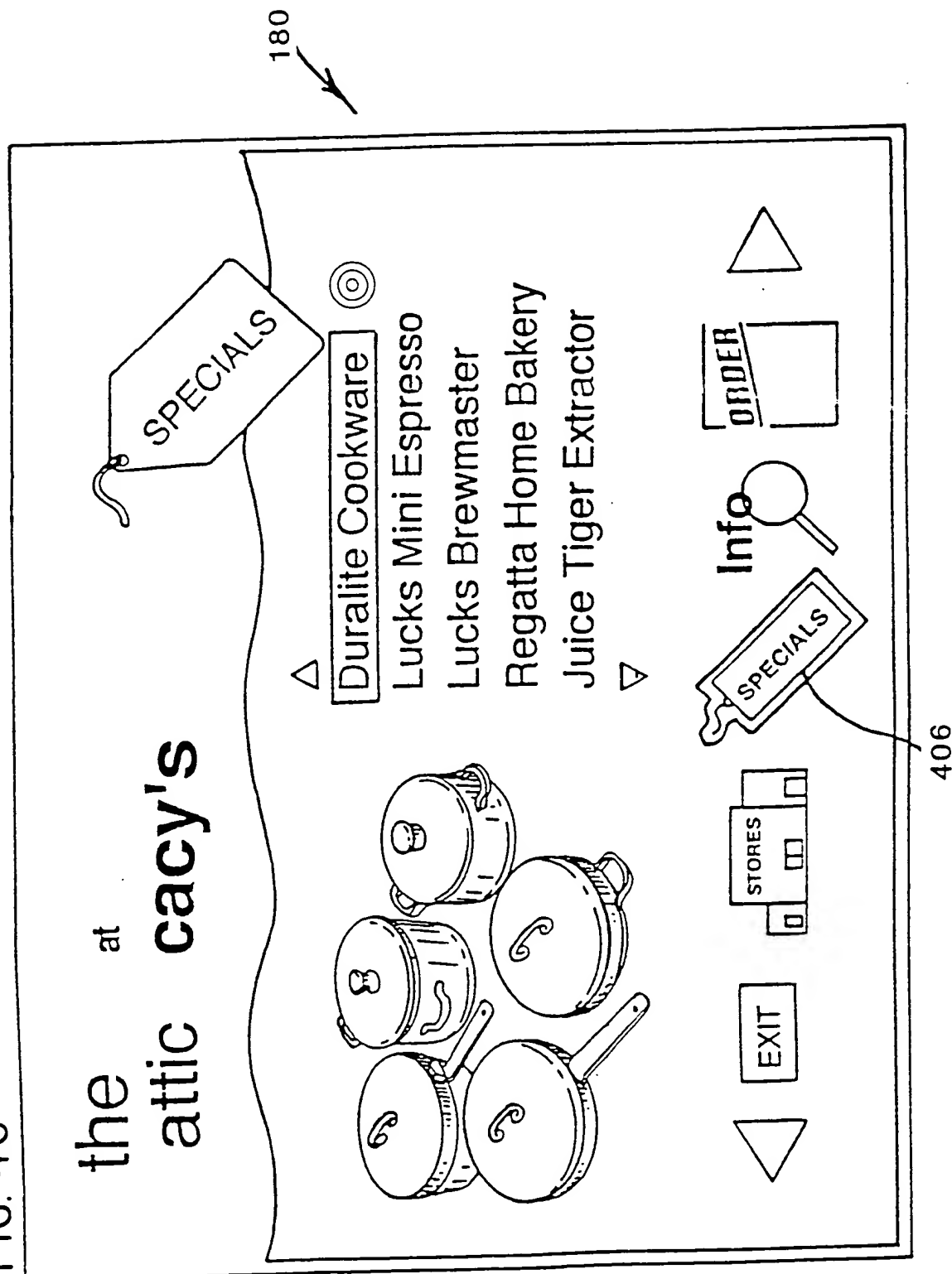
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FIG. 46



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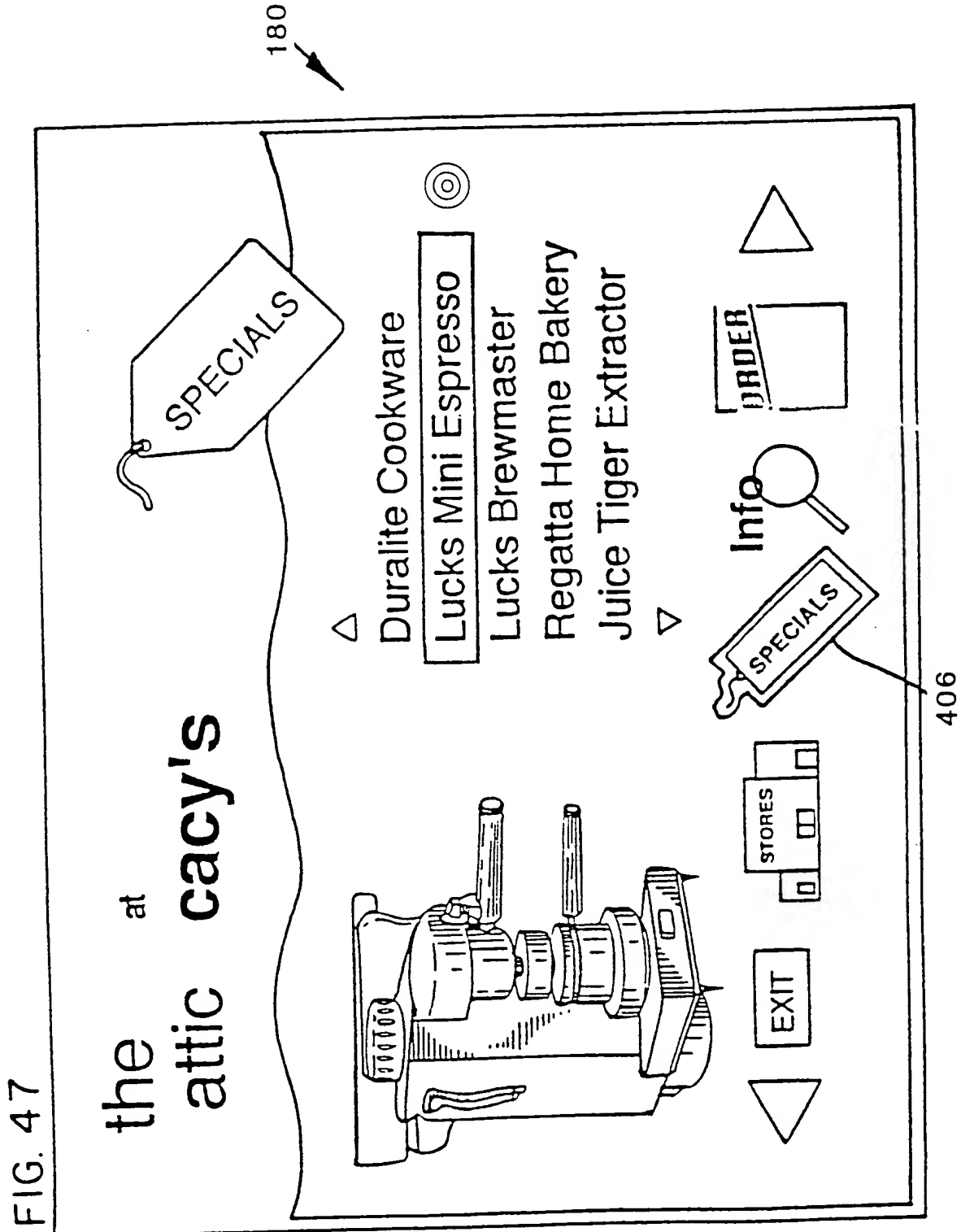
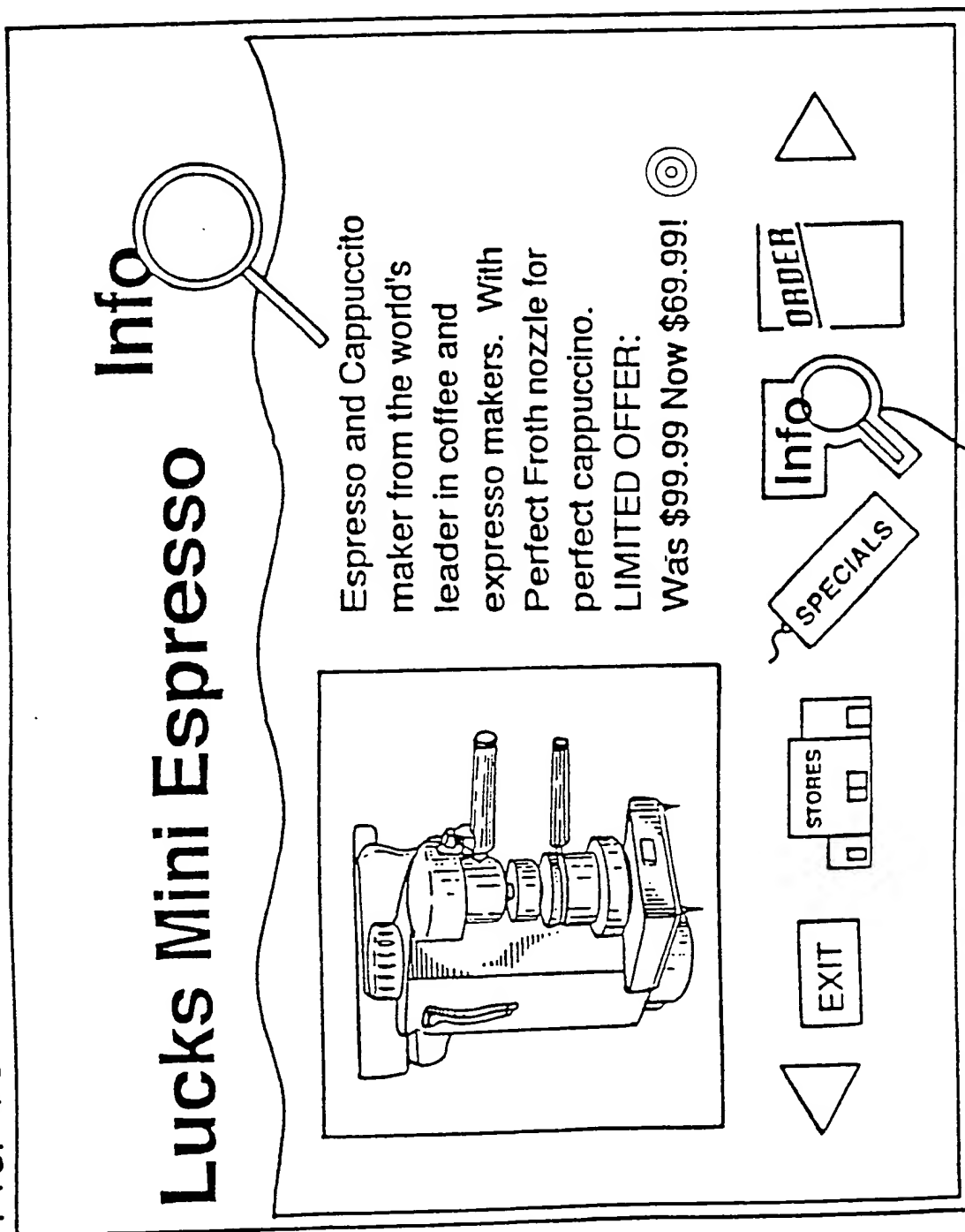


FIG. 48

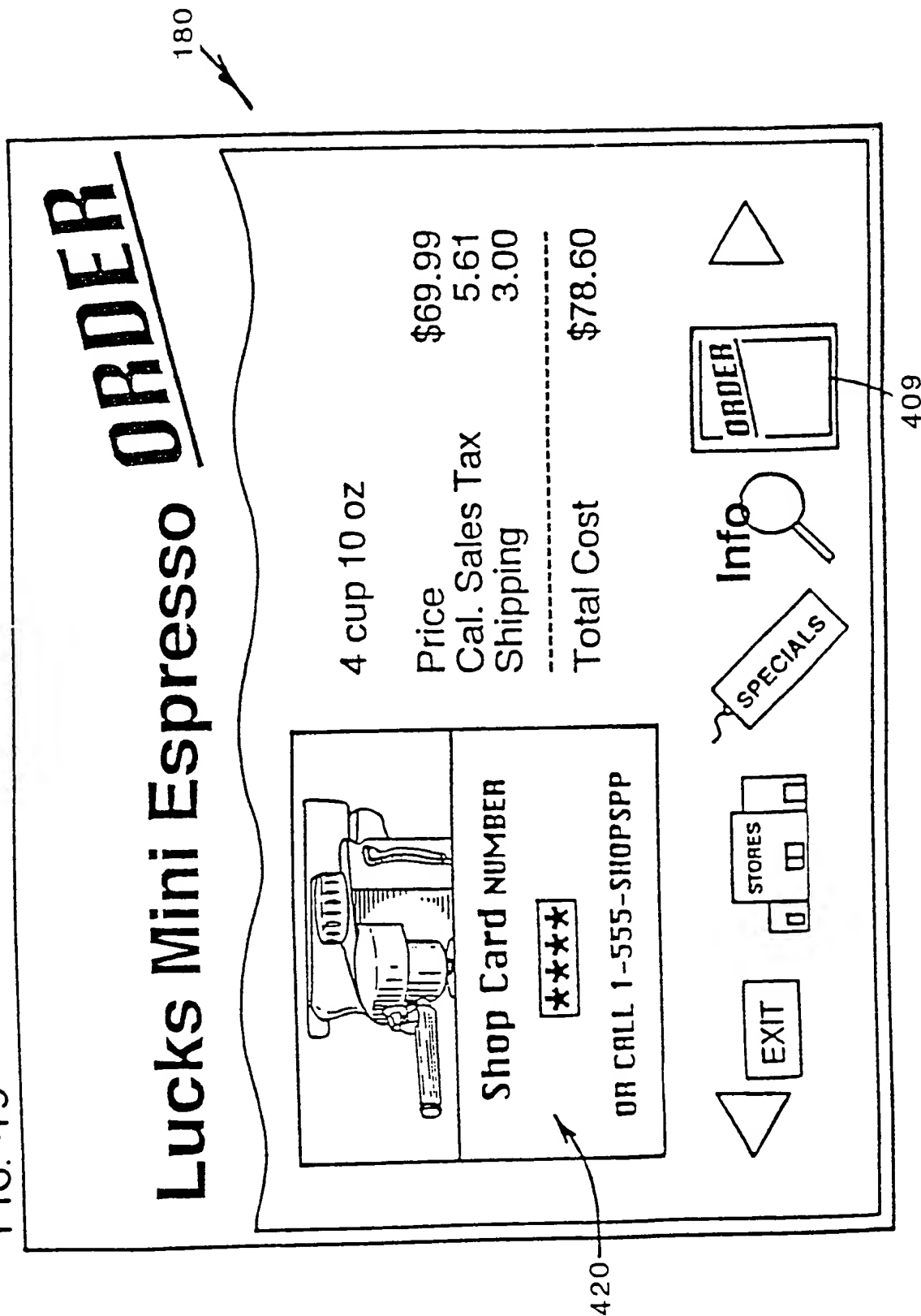


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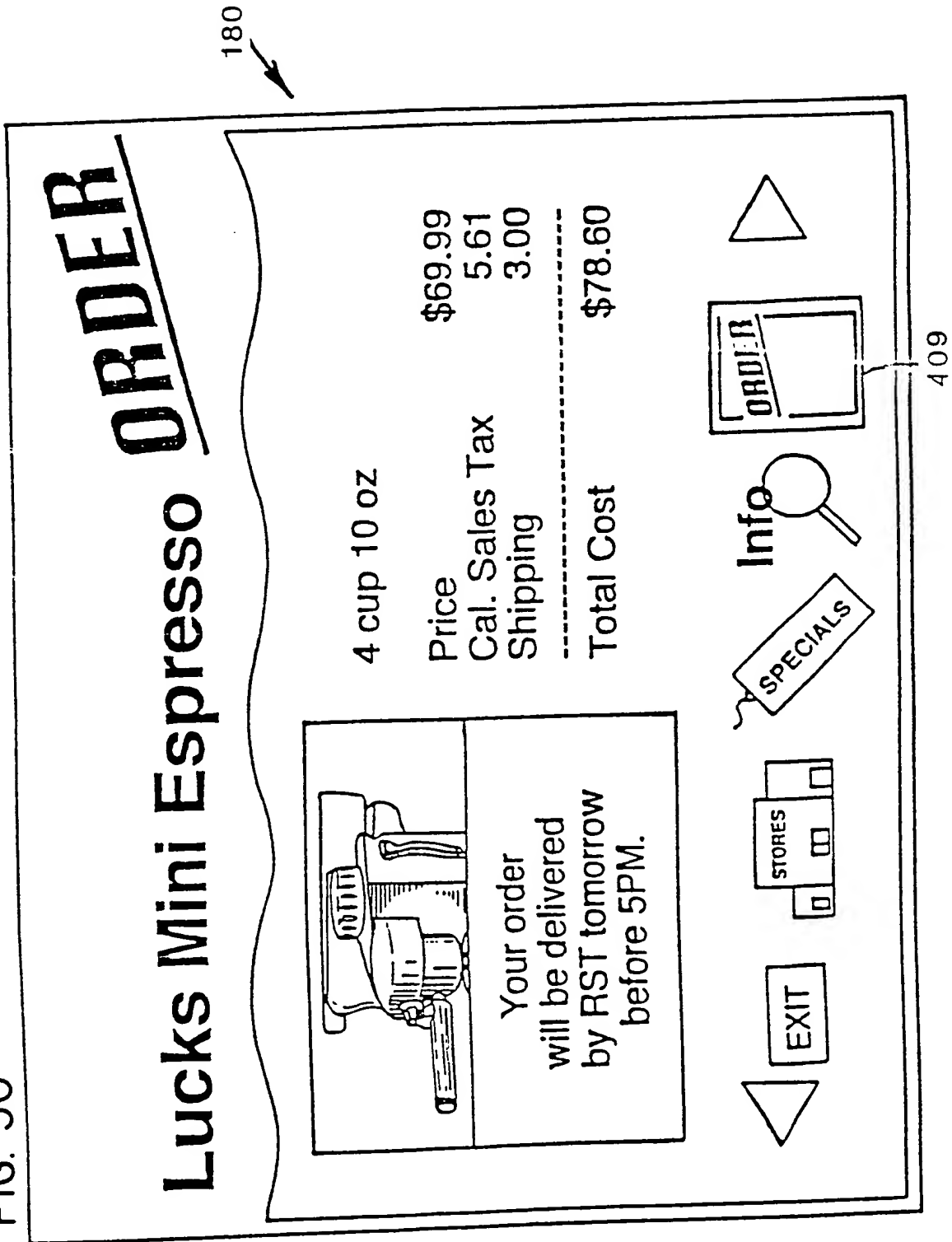
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FIG. 49



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FIG. 50



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 94/06993

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 H04N7/16 H04N7/173 H04N7/15

According to International Patent Classification (IPC) or to both national classification and IPC:

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 5 H04N G09B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	42ND ANNUAL CONVENTION AND EXPOSITION OF THE NATIONAL CABLE TELEVISION ASSOCIATION, 6 June 1993, SAN FRANCISCO, CALIFORNIA pages 82 - 89, XP000410485 MACK DAILY 'ADDRESSABLE DECODER WITH DOWNLOADABLE OPERATION' see the whole document ---	1
Y	18TH INTERNATIONAL TELEVISION SYMPOSIUM AND TECHNICAL EXHIBITION, 10 June 1993, MONTREUX, SWITZERLAND pages 555 - 567 HOARTY 'MULTIMEDIA ON CABLE TELEVISION SYSTEMS' see the whole document --- -/--	1

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Date of the actual completion of the international search

8 September 1994

Date of mailing of the international search report

17. 10. 94

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Authorized officer

Greve, M

Information on patent family members

PCT/US 94/06993

Patent document used in search report	Publication date	Patent family member(s)	Publication date
WO-A-9311638	10-06-93	US-A- 5247364	21-09-93
		AU-A- 3222693	28-06-93

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